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Vietnam Supplemental

A marine corporal soaks his swollen foot in his helmet during a break in U.S. Third Marine Division operations near Da Nang. Supplemental equipment used by U.S. forces in Vietnam ranges from uniform accessories, such as this leatherneck's helmet and boots, to large tanks, helicopters and other weapons. Beginning on page 1 is Secretary of Defense McNamara's statement to the Congress covering the Fiscal Year 1966 Supplemental Appropriation for Southeast Asia.

Defense Department Budget Breakdown Fiscal Year 1967

In this issue of the *Defense Industry Bulletin* are featured the financial tables pertaining to the Defense budget for Fiscal Year 1967. Prepared by the Office of the Assistant Secretary of Defense (Comptroller), the tables present the FY 1967 budget in relation to budgets of recent years.

The tables appear on pages 27-36 and cover the following areas:

1. Financial Summary, FY 1961 to FY 1967.
2. Direct Budget Plan [Total Obligational Authority (TOA)], New Obligational Authority (NOA), Direct Obligations and Expenditures, FY 1965–1967.
3. Direct Budget Plan (TOA), New Obligational Authority, Direct Obligations and Expenditures, FY 1967—By Functional Title and Service.
4. Procurement, FY 1965–1967.
5. Research, Development, Test and Evaluation, FY 1965–1967.
6. Estimated Obligations and Amounts Available for Obligation, General Fund Appropriations, FY 1965–1967.
7. Estimated Expenditures and Amounts Available for Expenditure, FY 1965–1967.
8. Order of Magnitude Data on Comparative New Obligational Authority by Functional Title as if FY 1967 Budget Structure Had Been Adopted Circa 1948.
9. Order of Magnitude Data on Comparative Expenditures by Functional Title as if FY 1967 Budget Structure Had Been Adopted Circa 1948.
10. Estimated Expenditures for Vietnamese Support, FY 1966 and 1967.

Reliable Redstone Missile Reactivated for Project Defender

A modified version of the Army's famed Redstone missile, brought out of retirement last June, has been launched successfully from the Pacific Missile Range, Point Mugu, Calif. The successful launch, which took place after nearly two months of exposure to severe storms and salt spray from the Pacific Ocean, demonstrated anew how the rocket got its nickname, "Old Reliable."

The missile was one of several Redstones reactivated by Chrysler Corporation's Missile Division under contract to the U. S. Army Missile Command. The modification and launch program is sponsored by the Advanced Research Projects Agency (ARPA) as part of Project Defender, a series of investigations in ballistic missile defense.

Redstone was selected for use in Project Defender because of its proven reliability, mobility and flexibility which permits adaption to the ARPA mission with a minimum cost and reaction time. The missile has chalked up an overall performance record of 95 percent successful flights.

The Army Missile Command is managing the Redstone launch program for ARPA, an agency of the Defense Department.

DEFENSE INDUSTRY BULLETIN

Published by the Department of Defense

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The purpose of the *Bulletin* is to serve as a means of communication between the Department of Defense (DOD) and its authorized agencies and defense contractors and other business interests. It will serve as a guide to industry concerning official policies, programs and projects, and will seek to stimulate thought by members of the defense-industry team in solving the problems that may arise in fulfilling the requirements of the DOD.

Material in the *Bulletin* is selected to supply pertinent unclassified data of interest to the business community. Suggestions from industry representatives for topics to be covered in future issues should be forwarded to the Business & Labor Division.

The *Bulletin* is distributed without charge each month to representatives of industry and to agencies of the Department of Defense, Army, Navy and Air Force. Requests for copies should be addressed to the Business & Labor Division, OASD(PA), Room 2E813, The Pentagon, Washington, D.C. 20301, telephone, OXford 5-2709.

Supplemental Budget for Southeast Asia

Excerpts from statement of Secretary of Defense Robert S. McNamara before a joint session of the Senate Armed Services Committee and the Senate Subcommittee on Department of Defense Appropriations on the Fiscal Year 1966 Supplemental for Southeast Asia.

When I appeared before this Committee last August with the Amendment to the FY 1966 Defense Budget, I described to you the actions we were taking to carry out the President's decision to deploy a force of 125,000 U.S. military personnel in South Vietnam and to be prepared to deploy still more forces if that should become necessary. I noted at the time that if we were to maintain our capabilities to deal with crises elsewhere in the world, these deployments would require some increases in forces, personnel, operating rates, production rates and construction of facilities above the levels provided in our original FY 1966 budget.

Because we had not had time to work out detailed personnel plans and to calculate on a phased basis the increases in activity rates, the movements of troops and materiel and the other operation and maintenance costs associated with the build-up in Southeast Asia, we proposed to finance the additional military personnel and O&M costs under Section 612 of the FY 1966 Defense Appropriation Act. Similarly, because we had not had time to develop detailed estimates of production and construction plans for the additional materiel and facilities required, we proposed, and the Congress appropriated, an additional $1.7 billion in a separate account, "Emergency Fund, Southeast Asia." This appropriation was intended to provide for the additional financing needed through early 1966 to gear up the production machine—accelerate the delivery of essential items already in production, initiate production of new items required for the support of our forces in Southeast Asia—and construct the most urgently needed facilities.

I said at the time that when we appeared here this January, we would have a much more precise estimate of the additional requirements and our financial needs for the balance of FY 1966. These estimates are now available, and total $12,345,719,000 in new obligational authority.

Inclusion of Certain Military Assistance Support in the Defense Budget.

Included in our supplemental request for FY 1966 is about $200 million for the support of South Vietnam's armed forces and other free world military assistance forces engaged in that country. These requirements have heretofore been financed in the Military Assistance Program. However, now that large U.S. and other free world military assistance forces (e.g., Korean) have joined in the defense of South Vietnam, the maintenance of separate financial and logistic systems for U.S. and military assistance forces is proving to be entirely too cumbersome, time-consuming and inefficient. The same problem was encountered at the outset of the Korean War. It was solved, then, by programming, budgeting and funding for all requirements under the "military functions" appropriations and providing a consolidated financial and supply system for the support of U.S., Korean and other friendly forces engaged in that effort. This arrangement gave the field commanders maximum flexibility in the allocation of available resources and improved the support of the forces employed. We are proposing essentially the same solution for the problems now being encountered in South Vietnam.

Under the proposed arrangement, all unexpended balances of FY 1966 and prior year military assistance funds for South Vietnam would be transferred to and merged with the accounts of the Military Departments; and all additional funds required for the support of the forces of South Vietnam and other free world military assistance forces in that country would be authorized for and appropriated to the accounts of the Military Departments. The remainder of the Military Assistance Program would be legislated separately.

Further Force Augmentations and Related Personnel Increases.

If we are to be prepared to deploy additional forces to Southeast Asia, some further augmentations of our forces and personnel strengths are required. The increases in forces and personnel now proposed are summarized in Table 1 (tables referred to start on page 37). The first column shows the personnel increases approved in August 1965 and the second column the increases as revised in January 1966. A number of these changes require some explanation.

In the Army, the major change since last August is in the number of additional military personnel required for the support forces. Inasmuch as it appears desirable to be in position to deploy additional forces without calling up reserves, these support units must be provided in the active force structure. In addition to that change, we have also added another increment of Army aviation companies to the number approved in August.

The major increase in the Marine Corps over last August is an additional division force, together with a number of tactical helicopter squadrons, observation squadrons and an air support control unit.

In the Navy, we have added to the forces approved in August: 11 LST's and one refrigerator stores ship for logistic support; more SWIFT boats and a mother ship to augment our coastal patrol activities; a number of river control boats and yard craft; and one destroyer. We have also augmented the Navy construction battalions in the Pacific area and are adding four new construction battalions to the Navy structure.

The increases in the Air Force are related to the retention of B–57 and F–102 aircraft previously scheduled to be phased out, a major expansion in the rotation and training base and the logistic support required for the forces in Vietnam.

As shown on the bottom of Table 1, a total of about 510,000 military personnel will be required to man the additional forces and support the increased training, rotation and logistic base. Other adjustments in forces and activities will add another 17,000, but our decision to substitute some 58,000 civilian for 74,000 military personnel spaces will reduce the net

increase over the original end of FY 1966 military personnel strength to about 453,000, and 113,000 more than the increase approved last August. . .

Table 2 provides a recapitulation of the proposed personnel increases, including those related to Southeast Asia. The second column shows the additional personnel required for the support of the Southeast Asia effort over and above the numbers provided in the original FY 1966 Budget as shown in column one. The third column shows the adjustments resulting from the substitution of civilians for military personnel. The fourth column shows other adjustments (pluses and minuses) related to productivity savings, non-Southeast Asia related force changes, etc. The fifth column shows the net additions to the original end FY 1966 strengths. The next column shows the number scheduled to be on hand at end FY 1966 and the last column the balance to be added thereafter.

Additional FY 1966 Requirements for Procurements, RDT&E and Construction.

Table 3 shows the additional funds required for the balance of the current fiscal year for procurement, for research, development, test and evaluation and for military construction in support of our combat operations in Southeast Asia. Of the $1.7 billion added to the FY 1966 Budget last August, about $1,534 million was applied to procurement, particularly for long lead time components, new production equipment, tooling and all the actions necessary to accelerate production rates—but not actually to finance these higher production rates beyond about February 1966. That is the purpose of the additional $7 billion which we are now requesting for procurement in this FY 1966 Supplemental for Southeast Asia.

The balance of the $1.7 billion added to the FY 1966 Defense Budget last August, about $166 million, was used to finance (through February 1966) the most urgent construction projects needed for the support of our military operations in Southeast Asia. The additional $1,238 million included in the Supplemental will complete the financing of the FY 1966 increment of that construction program.

In preparing the estimates of our financial requirements for the balance of FY 1966, we have assumed, for budgeting purposes, that combat operations will continue through the end of June 1967; thus the entire requirement for the longer lead time items through that date is included in this Supplemental.

Ammunition.

As shown on Table 3, about $2.1 billion is included in the FY 1966 Supplemental for ammunition which, together with the approximately $1.1 billion included in the original FY 1966 Budget and $800 million from the August Amendment, gives us a total of about $4.1 billion for FY 1966. This is, admittedly, a very high figure; but our operational plans call for a massive application of firepower to enhance the effectiveness of our forces and reduce casualties.

We estimate that our ground forces (including associated helicopter units) are now consuming ammunition at the rate of about $100 million per month, and we are budgeting for a consumption rate considerably higher. . . .

With regard to air munitions, we are now consuming at a rate of about $110 million per month; and we are preparing to support a much higher rate. . . .

Aircraft.

Although the aircraft loss rate continues low, the rapidly increasing number of sorties is resulting in larger total losses. . . . A total of about $1.8 billion for the replacement of aircraft losses is included in the FY 1966 Supplemental. Another $168 million is included for the Army to equip new aviation units.

The considerably higher rates of utilization of many types of aircraft in all the Services will also increase the consumption of spares. . . . Accordingly, we have included in the FY 1966 Supplemental about $1.2 billion for aircraft spares and other aircraft equipment for all the Services.

Other Materiel.

The additional funds requested for vehicles, electronics and communications and other procurements are mostly to equip new units, notably the additional Army and Marine Corps divisions, and for logistic and training support as well as to equip the new facilities being built in Southeast Asia.

Increases in Production Rates.

To support these higher rates of consumption and combat attrition, rebuild inventories and provide for the additional forces, we have greatly increased production rates and started new production lines. Planned production rates of the principal types of helicopters used in Vietnam have been just about tripled and certain fixed-wing types just about doubled. Production rates of the principal munition items have been increased many fold and major increases have been made in the production of tropical uniforms and jungle boots.

Research, Development, Test and Evaluation.

The $152 million included in the FY 1966 Supplemental for RDT&E is to accelerate certain development projects of particular interest to our operations in Southeast Asia. You may recall that one of the items included in our first set of amendments to the FY 1962 budget was the sum of $122 million for research and development of non-nuclear weapons and equipment specifically designed for limited wars and counter-insurgency operations. Since that time, we have vigorously pursued our efforts in that area and many of the new weapons, equipment and techniques now being employed in Vietnam came out of this work, e.g., the armed helicopter, jungle communications equipment, battlefield radars, defoliation agents, emergency airfield equipment, lightweight body armor, minigun armed aircraft, ammunition for M–79 grenade launchers, jungle boots, etc.

Many other items of this type are now well along in development. In order to make them available for use in Vietnam at the earliest possible time, we have undertaken a new effort called Project PROVOST (Priority Research and Development Objectives for Vietnam Operations Support), designed to identify those current R&D projects which could make a significant contribution to our military operations in Vietnam, and which, with additional funds, could be brought to fruition relatively quickly. So far the Military Departments have identified over 150 items of this type, and we have already utilized about $58 million from the FY 1966 R&D Emergency Fund for their support. We are now requesting an additional $152 million for FY 1966 to continue and expand this effort and to meet other urgent requirements. Among the items to be supported with these additional funds are the development of a therapeutic

(Continued on Page 37)

Total Package Concept

by

Maj. Gen. Charles H. Terhune, Jr., USAF

When Lockheed Aircraft Corporation was selected as the supplier to build the Air Force's C–5A cargo plane for almost $2 billion, it marked a major step toward the implementation of a new purchasing concept likely to influence the future pattern of acquisition of most major weapons systems.

The C–5A will be a massive jet aircraft capable of transporting the heaviest battle equipment on intercontinental missions. Twice the size of the largest existing carrier, the C–5A will weigh more than 350 tons and will carry 100 tons of cargo better than 2,700 nautical miles at a fraction of the ton-mile costs of existing air transports.

To bring the giant plane into being, the Air Force is making its first employment of the Total Package Concept (TPC) of system acquisition. The concept is so new, of such magnitude and of such importance to contractors, suppliers and taxpayers that the functioning of the concept has continued to vie in interest with the challenge and excitement of the plane itself.

Heretofore, Air Force purchases of complex equipment and systems customarily involved separate contract actions for research and development, production, associated aerospace ground equipment, training devices and spare parts for maintenance. This previous method of system acquisition caused a major area of general concern.

A de facto pattern emerged in which the element of competition too often was limited to the research and development phases. By the time a system advanced to the production stage, the Air Force was frequently faced with one choice: the company which had done the earlier work was the sole source of production. By comparison, the TPC offers a means for extending the competitive umbrella to a major portion of the total program requirements as well as covering the design, development and test effort.

There is a long jump between learning how to make a radical change in the purchasing technique and determining whether and when that change should be made. These facets caused considerable concern among everyone directly involved. Being custodian and overseer of billions of dollars of the taxpayers' money is a serious responsibility in itself. In addition, there is the haunting suspicion that totally unforeseen trouble zones might cost too much in the long run, or even adversely affect the quality and supply of needed equipment to the operating commands.

The old, established contracting procedures had survived the test of experience. Although they had weaknesses, they produced the goods. We knew they worked. The TPC, while having very desirable aspects, was an untested theory. Consequently, as the commander charged with the job, I felt that the theory had to be subjected to a step-by-step analysis by the most experienced minds available in order to provide assurance as to the practicality of the new procedures.

Therefore, we formed a group of some 20 specialists (from fields of procurement, management, production, etc.) and charged them to make a detailed, critical analysis of all facets of the proposed method of acquisition. Some 32 areas were identified and intensively examined for potential problems. A great number of skilled man-hours went into this conceptual review. And then, with the resultant report and suggestions, decisions were made as to the manner of applying the Total Package Concept to the procurement of the C–5A.

Maj. Gen. Charles H. Terhune, Jr., USAF, is Commander of the Aeronautical Systems Div., Air Force System Command, located at Wright-Patterson AFB, Ohio. Prior to his present assignment, he commanded AFSC's Electronic Systems Div. and, from 1954 to 1959, served as Dep. Commander for Ballistic Missiles of the Air Force Ballistic Missiles Div.

The implications of that action may be far-reaching. Total results have yet to be proved but, in my opinion, the Total Package Concept and its derivatives could apply to most weapon and support system procurements in the future.

The TPC aims at one fixed-price-incentive contract to cover development, testing, production of the major portion of the operational requirement and most of the required logistic support, including aerospace ground equipment and the pricing of spare parts and contract technical services. All terms and conditions of the contract, including price, are agreed upon at the outset, immediately after completion of contract definition, but before the selection of a source for the development production contract and while the matter still rests in a competitive environment.

In the case of the C–5A, Boeing, Douglas and Lockheed competed for the airframe contract while General Electric and Pratt and Whitney vied for the engine contract. Final award went to the competitor whose technical and price proposals were considered to provide the greatest overall value throughout an estimated 10 years of operation. We anticipate that this application of the TPC will allow the Air Force to realize significantly lower costs and better operational performance.

The impact on the contractor is considerable: it minimizes "buy-in" bidding on the development contract with its attendant problems of understated costs, overstated performance characteristics and unrealistic delivery schedules. Additionally—and future experience with C–5A will test this thesis—the TPC could prove a catalyst that will encourage simplicity of production design during development, a time when relatively small effort can result in large efficiencies during subsequent production. This will mean reduced costs to the taxpayer and increased profits to the contractor.

Finally, TPC will require the contractor to obtain supplies and services from the most efficient source. It will encourage competitive outside

procurement and it will provide fresh opportunities for efficient suppliers, large or small. In this environment there can be no substitute for quality. Nor can the contractor display other than the highest type of integrity. He and his associates and the Government will have a lot of eggs in one basket.

Incentives built into the Total Package Concept affect not only the cost but also the delivery and performance of the end item. This control is generated by certain peculiarities of the contract terms and conditions. Some examples:

• **Correction of deficiencies.** The contractor is held responsible for correcting any deficiencies in the material furnished at no charge in total target cost, target profit, or contract ceiling price for six months after Category II testing is complete, or six months after delivery of each aircraft thereafter.

• **Control of changes.** Changes in the C–5A with an individual cost of less than $100,000 will be accomplished at no change in contract targets or ceiling. Those over $100,000, but less than one percent of the initial total contract target costs, will normally be negotiated at appropriate increases in target cost, target profit and contract ceiling price so long as the cumulative effect of such changes is less than three percent of the initial total contract target cost. Thereafter, with certain exceptions, the profit allowed for any approved changes will not exceed two percent of the agreed target cost.

• **System responsibility.** The contractor has overall responsibility for the performance of the total system, including all contractor furnished equipment and all the integration and performance of the engine subsystem which is Government furnished. (The engine contractor, of course, will be responsible for producing and delivering engines and related equipment in conformance with specifications and other contractural requirements.) In the C–5A procurement, the airframe and engine competitors entered into contracts which spelled out the responsibilities of each and the conditions for sharing risks and rewards.

• **Progress payments.** Because the magnitude of the task and expenditures involved before the first deliveries will be made, the contractor for the C–5A will receive 90 percent progress payment during the initial stages of the program instead of the customary 70 percent. Later, the rate of progress payment will revert to 70 percent.

• **Fluctuations of economy.** The possibility of significant inflationary or deflationary economic trends is a recognized risk in long term contracts. Therefore, the C–5A engine contract includes a provision to revise target cost and ceiling price, beginning three years after the award, to reflect abnormal fluctuations by the economy. The airframe contractor elected to omit this provision.

• **Labor law changes.** Another provision exists for equitable adjustment in target cost, target price and ceiling price if Federal laws governing work conditions, wages and fringe benefits cause abnormal changes in labor costs or labor overhead.

Despite limited experience to date in the application of TPC, I am quite confident it will grow in prominence as a means for system acquisition. At each milestone along the way, the concept will come under renewed scrutiny to determine how well it lives up to expectations and what adjustments need to be made to achieve our mutual goals. However, even at this stage, it is clear that the benefits and features of TPC offer great potential for both industry and Government.

Caravan of military vehicles unloads from a mock-up to the planned U. S. Air Force C-5A transport aircraft.

AF Buys New Long Tank Thor Space Boosters

The Air Force Systems Command will purchase 21 newly designed long tank Thor space boosters to meet more difficult launch requirements.

The new version, which will have a greater payload capability than previous models, will be unveiled for the first time next summer.

Developed on the "building block" concept, which provides for graduated expansion of the Thor's capability, the long tank version offers added payload capability by increasing the volume of liquid propellant tanks.

The liquid oxygen tank has been extended and the conical upper section of the booster has been changed to a straight cylinder of the same diameter as the rest of the airframe. These features permit a longer burn time for the main engine, making it possible for the long tank Thor to hurl 20 percent heavier payloads into space than the present thrust-augmented Thor.

Although the total thrust of 330,000 pounds is essentially the same as that for the thrust augmented conical configuration, the long tank Thor attains its increased payload capability with a 216-second burn time compared to 146 seconds for the thrust-augmented Thor.

Combined with various upper stages, the long tank Thor is expected to shoulder the majority of the Air Force's space programs at Vandenberg AFB, Calif.

The FDL Ship Project

by
RAdm. Nathan Sonenshein, USN
Program Dir., FDL Ship Projects
Bureau of Ships

Three thrusts, or streams of effort, intersect in the Fast Deployment Logistics (FDL) Ship Project.

First, the development of a seaborne system for rapid deployment of U.S. forces.

Second, the trial application of contract definition processes for ships.

Third, the trial application of the "total package" approach for ship procurement.

Let me discuss briefly each of these efforts, starting with a summary of the development of rapid deployment concepts. In response to the Secretary of Defense's interest in developing efficient methods for basing U.S. ground forces on this continent and deploying them rapidly to overseas areas, in 1964 the Navy initiated concept studies on the Logistic Support of Land Forces, commonly known as LOGLAND. Increased flexibility and speed of response, reduction in total cost and improvements in the international balance of payments were obvious objectives.

LOGLAND became the wellspring of the FDL when it developed that ship systems could play a vital and effective role in the deployment of ground forces, especially their heavy equipment. Thus evolved the concept of large fast ships with both rapid cargo handling capabilities and embarked lighterage and helicopters for over-the-beach unloading in the absence of port facilities.

A versatile system was envisioned: in one possible mode of operation, these ships would be loaded with ground force divisional equipment maintained in a ready-to-roll condition. With FDL ships strategically deployed, airlifted troops would rendezvous and marry up with the heavy equipment on short notice. Thus, in the rapid deployment of ground force equipment, the FDL's would complement the C–5A's and other airlift aircraft.

The second major stream of effort in this project is to apply the contract definition process to ships. This approach has been successfully applied in the development of numerous weapon and aircraft systems; the FDL application represents a "first" for ships, and adaptation and refinement of the process may be necessary. To assist those who are not acquainted with DOD terminology, a few definitions may be in order:

• **Concept Formulation** describes the activities preceding a decision to carry out engineering development. These activities include comprehensive system studies and experimental hardware effort under exploratory and advanced development and are a prerequisite to carrying out engineering development.

• **Contract Definition**, until recently referred to as Project Definition Phase, is that phase during which preliminary design and equipment are verified for accomplishment and firm contract and management planning are performed.

The total package approach to ship procurement is the third major thrust of the FDL program. In this project, the total package will consist of four major elements:

• Ship Design and Development.

• Facilities Plan.

• Ship Construction (Multi-year, Series Production).

• Ship Performance.

Emphasis is placed not only on the initial acquisition cost of ships, but on the entire package as well—from design, through facilities improvement for construction, ship production by series production and, finally, to reliability, maintainability, maintenance, operating cost, correction of deficiencies and guarantees or warranties of cost and performance for a selected number of years after delivery. Heavy emphasis will, therefore, be placed on design work study, value engineering, shipyard automation, minimum maintenance, preservation methods and and other techniques for reducing the maintenance and operating costs of ships, which greatly exceed their initial acquisition costs. For example, a new class of Navy reefer ships, designated AFS and now being delivered to the Fleet, will have an estimated 20-year maintenance and operating cost of $63 million while their initial construction cost is only $27 million.

With these new procurement concepts, we expect to attain:

• Added impetus to the modernization of shipbuilding techniques and facilities.

• Lower average cost of ships.

• Increased standardization of ships.

• Increased industry input into Naval ship design and construction.

The anticipated additional impetus for the modernization of private shipbuilding techniques and facilities is an important consideration in this concept. Sweden's Arendal Yard is a prime example of a modernized shipyard. This yard was placed into service in mid-1963 in Gotaverken, Sweden, and represents, in my opinion,

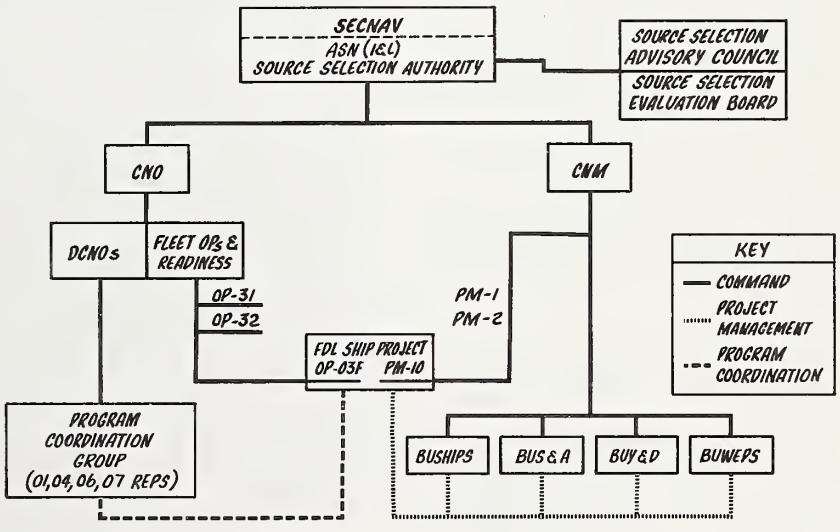

Figure I.

the most advanced shipyard in the world for the production of commercial type ships. It is producing 70,000 dead-weight-ton tankers at 40 percent of the man-hours used in producing similar ships at its parent conventional shipyard five miles distant. It emphasizes a steady, straight line flow of material by mechanical conveyors from the plate yard, through fabricating stations, to a major assembly shed and intense application of the most modern methods of production control. In the assembly shed, subassemblies up to 300 tons in weight are placed on building ways and large hydraulic jacks literally extrude the partially assembled ship into the building docks as each successive section is added. Methods such as these are permitting this yard, whose wage rates are more than twice as great as those in Japan, to deliver ships competitively priced with those produced in Japan. Those ships are delivered in 20 weeks from start to trials after a seven-week erection period.

In sharp contrast to this exciting advance in shipbuilding facilities in Sweden, which is paralleled by similar progress in Japan and other European countries, there has not been a major shipyard constructed in the United States since the end of World War II; and facilities improvements in private yards have been, with a few notable exceptions, only minor. It is our expectation that application of the total package approach on a multi-year basis, permitting series production of a substantial number of ships, will encourage and permit the construction of new, or the modernization of old, facilities to equal or better the productivity being attained in yards such as Arendal. In fact, it is our belief that the offerors will find it advantageous to use such approaches, and our studies indicate that the cost of such improvements could be amortized in the kind of project we are planning.

Our expectation to achieve the second point—lower average cost of ships—is founded again on the fact that we contemplate constructing a large number of ships in series and, thereby, taking full advantage of the phenomenon known as the progressive curve. Various mathematical formulations have been developed to express the relationship that has been observed in series production. In general, they say that, as the total quantity of units produced doubles, the cost per unit declines by some constant percentage. Thus, if we speak of a progress curve with a slope of 85 percent, we mean that as the number of units produced is doubled, unit costs are decreased by 15 percent. Analytical studies comparing various quantities of ships show that significant gains in cost and time can be accomplished through series production and modernization. During World War II, the first five Victory ships built in a yard required an average of 1,100 man-hours per ship. In that yard, the number of man-hours dropped to 711 when about 30 of these same ships were constructed in series.

Increased standardization of ships is the third expected result of the new procurement concepts. From the point of view of the Fleet, which has to operate Navy ships, this is probably the most important attribute because it impinges directly on the logistic support of ships and the training of men to operate equipment in the ships. Lack of standardization is one of the least desirable by-products of our present method of ship procurement. Of about 180,000 hull, machinery and electrical components controlled through the Ship's Parts Control Center in Mechanicsburg, Pa., 22 percent have only one application in the Fleet. Series production of all the FDL ships in one shipyard should provide a direct route to essentially complete standardization.

Finally, the new procurement concepts will also increase industry input into naval ship design and construction. There are currently in the United States over 300 private shipyards capable of construction and repair of ships, and there are some three dozen private design agents. By way of definition, I should say that preliminary design, contract design and detailed construction design are three steps of increased refinement in the preparation of USN ship designs. Very few shipyards have organic design capabilities beyond preparation of construction plans, but depend instead on design agents for preparation of preliminary and contract design. Only 78 shipyards can handle ships over 400 feet in length and about 16 design agents have been dealing actively in recent years with the Navy Department in connection with its shipbuilding programs.

Of these 94 concerns (78 plus 16), very few have preliminary and contract design capability. The lack of ship design, system management, or operational analysis capability among shipyards is a result of existing ship procurement practices; however, it need not be a bar to attaining such capability either by contract or by direct hire. In fact, this method of obtaining such support is now common practice in the shipbuilding industry in this country. Incidentally, it is not our intention to require recompe-

(*Continued on Page 42*)

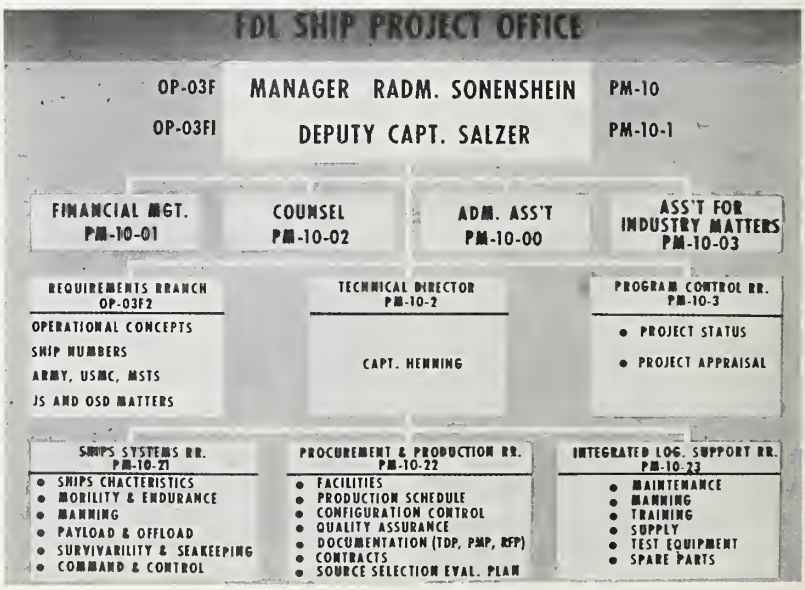

Figure II.

ABOUT PEOPLE

DEPARTMENT OF DEFENSE

Lt. Gen. James B. Lampert, USA, was designated principal Dep. Assistant Secretary of Defense (Manpower), effective Jan. 7. **Mr. Roy K. Davenport** was designated Dep. Asst. Secretary of Defense (Manpower) for Planning and Research, effective Jan. 2.

Col. Ben W. Legare, USA, has been assigned to the Office of the Asst. Secretary of Defense (Public Affairs). He will be relieved as Information Officer, Military Assistance Command, Vietnam, in February by **Col. Rodger R. Bankson**, USA. Col. Bankson has served as Special Asst. for Vietnam in OASD (PA) since June 1964.

Col. Fred H. Sitler, USAF, has been assigned as Commander, Defense Industrial Plant Equipment Center (DIPEC), Memphis, Tenn. He has been serving as acting commander since November following the retirement of **Col. Samuel F. Langley**, USAF.

Col. Bert S. Harris, USAF, is now serving as Chief of the Technical Test and Evaluation Div., Defense Communications Agency.

Lt. Col. Herbert D. Clark, USA, has replaced **Lt. Col. Jesse G. Hill**, USAF, who retired Nov. 30, as Executive Officer, Defense Documentation Center of the Defense Supply Agency.

DEPARTMENT OF THE ARMY

Dr. Jay Tol Thomas has been appointed Dir. of Research and Laboratories, U. S. Army Materiel Command (AMC) headquarters, Washington, D.C. He will be the first to fill the newly created position.

Lt. Gen. John L. Throckmorton has succeeded **Lt. Gen. W. H. S. Wright** as Chief, Office Reserve Components. Gen. Throckmorton has been Dep. Commander, Military Assistance Command, Vietnam, since July 1964.

Lt. Gen. James H. Polk has been reassigned to succeed **Lt.. Gen. Theodore J. Conway**, as Asst. Chief of Staff for Force Development, U. S. Army. Gen. Conway will assume command of the Seventh U.S. Army, Europe.

Brig. Gen. Lloyd B. Ramsey has been selected to fill the post of Dep. Chief of Information. He will assume his new duties March 1. Gen. Ramsey served as Dep. Commanding General, U.S. Army Training Center (Engineer), Fort Leonard Wood, Mo., prior to being selected for his new assignment.

Col. Raymond S. Crossman has been appointed Project Manager for the 2.75" folding fin aircraft rocket at Hq., U.S. Army Materiel Command, Washington, D.C.

Col. Arthur B. White has been appointed Chief, Technical and Industrial Liaison Office, Office of the Chief of Research and Development, U.S. Army.

Lt. Col. F. J. Dirkes has relieved **Col. Paul W. Ramee** as District Engineer for the Army Corps of Engineers at Savannah, Ga.

Col. Edmund Kirby-Smith has become Dep. Div. Engineer, South Atlantic Div., Army Corps of Engineers, Atlanta, Ga., succeeding **Col. John C. Potter, Jr.**

Col. Harry F. Cameron, Jr., has been named Mediterranean Div. Engineer for the Army Corps of Engineers, with headquarters in Leghorn, Italy. He takes over the position in March.

Maj. William A. Cole is serving as Acting Project Manager of the Sergeant Weapon System, Army Missile Command, Huntsville, Ala. He replaced **Col. J. Mort Loomis, Jr.**, who retired Dec. 31.

Brig. Gen. Keith L. Ware, 50, has become Chief of the Army's Office of Information relieving **Maj. Gen. George V. Underwood, Jr.**, Feb. 1.

The new Chief of Information, the thirteenth to serve in the position since it was created in January 1946, has also been selected for promotion to major general.

Gen. Ware has been Deputy Chief of Information since September 1963. Before coming to the Pentagon for duty he served as Assistant Division Commander, Second Armored Div., Fort Hood, Tex.

The new Army Information Chief was commissioned July 18, 1942, and served in Europe during World War II. He is a holder of the Congressional Medal of Honor, Silver Star and Bronze Star.

DEPARTMENT OF THE NAVY

RAdm. William M. Heaman has moved ahead from duty as Dep. Dir., Pacific Div., Bureau of Yards and Docks, to the position of Dir., vacated by **RAdm. James R. Davis**, who retired Feb. 1.

RAdm. William F. Petrovic has taken the helm as Commander, U.S. Naval Shipyard, Brooklyn, N.Y., from **RAdm. John H. McQuilkin.**

The U.S. Marine Corps has a new Dir. of Information. He is **Col. Paul M. Moriarty.** The outgoing director, **Brig. Gen. Arthur H. Adams**, has been reassigned as Commanding General, Marine Air Reserve Training Command, Glenview, Ill.

The following Marine Corps officers were advanced to the rank of brigadier general in January: **Brig. Gen. Earl E. Anderson, Brig. Gen. Clifford B. Drake, Brig. Gen. Michael P. Ryan** and **Brig. Gen. Frank E. Garretson.**

DEPARTMENT OF THE AIR FORCE

Brig. Gen. Hugh B. Manson has been named to succeed the late **Maj. Gen. Irving L. Branch** as Commander, Air Force Flight Test Center, Edwards AFB, Calif. Gen. Branch was killed in January when the plane he was flying in crashed into Puget Sound near Seattle.

Brig. Gen. Charles G. Chandler, Jr., Dir. of Maintenance Engineering in the Office, Dep. Chief of Staff, Systems and Logistics, has been reassigned as Dir. of Materiel, Pacific Air Force.

The new Chief of Electronic Systems Division's Electronic Data Processing Equipment Office is **Col. S. P. Steffes.** He replaces retired **Col. Edward McCloy.**

Col. Leonard W. Lilley has succeeded **Col. William J. McGinty** as Dir. of Information for the Air Force Systems Command at Andrews AFB, Md. Col. McGinty is now serving in South Vietnam as Dir. of Information for the 2nd Air Division.

Col. Joseph E. Andres has been named to replace **Col. George C. Hozier** as Dep. for Subsystems and Equipment Management at Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson AFB, Ohio. Col Hozier will retire from the Air Force on being relieved.

Col. Maurice R. Reilly has been ordered to Headquarters, Air Force Systems Command, Andrews AFB, Md., where he will serve as Dep. Dir. of Communications Electronics.

Col. George B. Munroe, Jr., has been assigned to the Office of the Dep. Chief of Staff (Research and Development) as Asst. for Foreign Development.

CALENDAR OF EVENTS

March 3-4: DOD-National Security Industrial Assn. Advanced Planning Briefings for Industry, Boston, Mass.

March 3-4: Third Annual Southeastern Symposium on Government Contracts, New York City.

March 9-10: DOD-National Security Industrial Assn. Advanced Planning Briefings for Industry, Atlanta, Ga.

March 16-17: DOD-National Security Industrial Assn. Advanced Planning Briefings for Industry, St. Louis, Mo.

March 21-24: Institute of Electrical & Electronics Engineers Exposition, New York City.

March 22-31: American Chemical Society Meeting, Pittsburgh, Pa.

March 24: Thirteenth James Forrestal Memorial Award Dinner, Washington, D.C.

March 27-April 2: American Society of Photogrammetry Meeting, Washington, D.C.

April 5-6: Armed Forces Communications Electronics Assn.-U.S. Army Electronics Command Symposium, Fort Monmouth, N.J.

April 11-15: Institute of Environmental Sciences Meeting, San Diego, Calif.

April 12-13: DOD-National Security Industrial Assn. Advanced Planning Briefings for Industry, San Francisco, Calif.

April 18-21: Aerospace Medical Assn. Meeting, Las Vegas, Nev.

April 18-22: American Geophysical Union Meeting, Washington, D.C.

April 18-22: American Society of Tool and Manufacturing Engineers Meeting, San Francisco, Calif.

April 24-28: American Society of Mechanical Engineers Meeting, Kansas City, Mo.

April 27-28: DOD-National Security Industrial Assn. Advanced Planning Briefings for Industry, Washington, D.C.

May 1-4: American Institute of Chemical Engineers Meeting, Columbus, Ohio.

May 1-4: National Association of Electrical Distributors Meeting, Miami Beach, Fla.

May 1-5: American Society for Microbiology Meeting, Los Angeles, Calif.

May 3-5: American Society of Lubrication Engineers Meeting, Pittsburgh, Pa.

May 9-11: National Aerospace Electronics Conference, Dayton, Ohio.

May 10-12: National Telemetering Conference, Boston, Mass.

May 11-13: American Helicopter Society Meeting, Washington, D.C.

May 16-20: American Society of Civil Engineers Meeting, Denver, Colo.

May 31-June 2: American Society for Quality Control Meeting, New York City.

AFA National Convention Slated for March 22-25

The Twentieth Anniversary of the U. S. Air Force combat commands—Tactical Air Command, Strategic Air Command and Air Defense Command—will be saluted at the Air Force Association national convention in Dallas-Fort Worth, Tex., March 22–25.

Highlighting the convention will be major policy addresses by Secretary of the Air Force Harold Brown and Air Force Chief of Staff General J. P. McConnell.

Seminars and symposiums on key aerospace issues will be held during the convention and a large air show will be staged at Carswell AFB near Fort Worth.

Eglin AFB Unit Redisignated as Lab

The Directorate of Armament Development at Eglin AFB, Fla., has been redesignated the Air Force Armament Laboratory, effective March 1, 1966.

The Air Force Armament Laboratory is responsible for exploratory, advanced and engineering development programs for non-nuclear munitions, targets and scorers, ballistics and associated areas.

The laboratory executes assigned projects and works closely with the Army, Navy and other Government agencies, and supports other Air Force Systems Command programs within assigned areas of responsibility.

Commanded by Col. Walter P. Glover, the Armament Laboratory is staffed by more than 300 military and civilian personnel. Laboratory activity is augmented by research and development contracts with industrial concerns and universities. Contracts currently in force are valued at over $50 million.

Two Handbooks on Civil Defense Emergency Available to Industry

The Office of Civil Defense has published two handbooks designed to help prepare the nation's industry for civil defense emergency. The two handbooks are titled, "Industrial Civil Defense Workbook" (Publication FG–F–3.3) and "Industrial Civil Defense Seminars" (Publication FG–F–3.2).

The purpose of the "Industrial Civil Defense Workbook" is to help the owners and managers of industrial and commercial enterprises prepare for survival in case of an attack on the United States. It is designed especially for use by proprietors or managers of facilities having relatively small staffs.

This booklet outlines the basic factors to be considered in making the company's civil defense plans. Because it provides space for recording the decisions, task assignments and other information needed to prepare the firm for a civil defense emergency, it serves as the framework for the company civil defense plan.

"Industrial Civil Defense Seminars" is a publication intended to help local civil defense directors, business or industry executives, or other interested persons who may be called on to plan, organize and conduct industrial civil defense seminars.

The handbook contains a detailed discussion of the factors on which a successful industrial civil defense seminar depends, as well as a checklist of required actions that can be used to evaluate the completeness of seminar arrangements at each stage of planning and managing such a conference.

Copies of both publications may be obtained, free of charge, from: U.S. Army AG Publications Center, Civil Defense Branch, 2800 Eastern Boulevard (Middle River), Baltimore, Md. 21220.

NOTES FOR EDITORS

Briefed below are some events and projects within the Department of Defense which may be of interest to writers and editors. If further information on any of these topics is desired, please write to Chief, Magazine and Book Branch, Office of Assistant Secretary of Defense (Public Affairs), Washington, D.C. 20301

AUTOMATIC WEATHER DEVICE DEVELOPED

Greatly improved weather forecasting capabilities have been provided Army field commanders with a new Atmospheric Sounding System. Heart of the transportable device is an automatic sounding set which processes data received from a sensing radiosonde carried swiftly aloft by specially designed balloons or rockets. Brief meteorological messages are produced by feeding into a computer information on temperature, humidity, wind speed and direction and atmospheric density. The system can also predict accurately the spread of atomic fallout.

LOW-MELT ICE CREAM BEING DEVELOPED

The Army is developing a low-melt ice cream for Navy submariners. Specifications call for an ice cream that will remain more than 80 percent unmelted for 15 minutes, even when served with other foods on a hot meal tray (about 100 degrees F.). The frozen dessert must also resist 80-degree room temperatures and look like, taste like and be as refreshing as the shore-dispensed product. By using additives and modifying the basic ice cream formula, the Army already has developed an ice cream that melted only 30 percent at 90 degrees during the test period.

EYE-BRAIN INFORMATION TRANSFER STUDIED BY NAVY COMPUTER

Navy scientists have adapted a computer technique to trace messages from receipt on the retina of the eye to their transfer to cognizant areas of the brain. The technique uses a flash stimulus the size of a pinhole in a large black background. Sensitive electrodes taped to the subject's skull record the arrival of the message in the brain. The computer measures the extremely short time delay between the eye and brain and between points at different locations in the brain. It also records the way the eye measures the growth of the amount of light from its first detection until it reaches maximum intensity. Furthermore, it is able to distinguish the difference in response between right and left eye and the strength of the input to the right and left lobe of the brain. A correlation between right and left eye strength and right and left handedness seems to be present.

AUTOMATED PACKAGING INFORMATION SYSTEM SLATED FOR DOD

A computerized system which automatically prints out packaging requirements for any item entering or already in the Defense Department inventory is being developed by the Air Force. The system will provide immediately usable packaging data based on characteristics of the item, mode of transportation, destination and other factors. Under the new concept, when an item requiring special packaging enters the inventory, the computer will be interrogated to determine whether an existing design will properly do the job. If no suitable design exists, engineers will develop a packaging method for the item. This information will then be fed into the data bank for future use on the same item or on items for which the design may be suitable. For items already in the inventory, the machine will quickly indicate the approved packaging design.

A low-melt ice cream for Navy submarines is being developed by food technologists at the U. S. Army Materiel Commmand's Natick (Mass.) Laboratories. Working on the project are Dr. Joseph Tobias (right), Professor of Dairy Technology, Food Science Department, University of Illinois, an Army Reserve lieutenant colonel who has a mobilization assignment at Natick, and Dr. Charles C. Walts of the Natick Laboratories' Food Division.

Trends in System and Cost Effectiveness Analysis

by
Lt. Gen. W. Austin Davis, USAF
Vice Commander, Air Force Systems Command

System effectiveness and cost effectiveness will be increasingly important concerns as our technology programs continue to advance and military systems become more complex and more costly. In addition, decision makers are being confronted with increasing options in systems approaches to meet given requirements. They must make qualitative and quantitative decisions that were unheard of until recent times.

Thus, the need is crucial for methods of assessing the effects of variations in technical and operational characteristics of weapons systems in order to achieve the best overall system effectiveness on a cost-acceptable basis. This means that we must further improve our analytical capabilities.

Both system effectiveness and cost effectiveness analysis are in their infancy. There are as yet no standard techniques for effectiveness prediction, evaluation and demonstration. We must have these standard techniques before we can have clear communication and, thus, real progress. The recently completed, year-long study by the Weapons Systems Effectiveness Industry Advisory Committee (WSELAC), which was sponsored by the Air Force Systems Command (AFSC), is a major step toward a standardized approach. This committee did not purport to develop new techniques but rather to pull together the best of existing techniques in the numerous funtional areas that influence total system effectiveness.

We have the beginning of a standard approach, standard ground rules and a standard modeling concept for performing effectiveness analyses that will permit the Air Force to be selective between proposals and to compare one to the other, using a common base line. For the first time, management will be able to follow the analyst step by step through the analysis process, check his data and its course, review his assumptions and insure that he works from the agreed upon point of departure. After a system has been selected from several proposals, these same techniques can then be applied to the selection of components or subsystems within a weapon system and, later on in the life cycle, to evaluate proposed changes or modifications.

After the system becomes operational, the same analytical approach can provide a rational basis for selection between alternative solutions to operational and support problems. For example, if the in-commission rate is falling below acceptable standards, should the commander request additional maintenance personnel or test equipment? Or should he provide special training to upgrade his assigned personnel? Or should he admonish his crews for abusing (overstressing) their equipment? Or does he have a more subtle problem—morale?

Rapid and economic analysis can assist in solving these and a host of other related and interacting problems. An especially attractive and promising feature of the analytical framework proposal by the advisory committee is its ability to deal with constantly changing situations, changes in missions and changes within a mission. This technique considers the implications imposed by the multistate, multimode, multimission characteristics deemed so desirable in modern weapons systems.

The advisory committee also provided a number of significant recommendations in the area of system effectiveness and cost effectiveness evaluations; and it recommended improvements in our maintenance data collection system necessary to support system effectiveness analysis. But for cost data to support the cost effectiveness analyses, the committee by-and-large looked to another Systems Command study program. This latter effort is known as the Management Information System Project; it proceeded concurrently with and intermeshed closely with WSELAC.

The Management Information System Project was established to enhance the posture of the AFSC in the area of cost estimating credibility by developing improved financial management procedures. A basic deficiency in the past has been the lack of a system for pyramiding of financial data, all having a common structure, auditable from the lowest data bit to the highest summary aggregation and acceptable at all levels of review within the Air Force and the Office of the Secretary of Defense. To alleviate these problems, the Management Information System Project has provided three new procedures:

- First is a cost estimating procedure which provides uniform methods for presenting estimates and for tracing changes in estimates. In addition to enabling a more sophisticated analysis of contractor estimates, the procedure will improve our ability to make independent cost estimates in-house. It provides for documentation of all informatin used in formulating the estimates—including data sources, estimating relationships, estimate confidence and statement of estimate results.
- Second is a cost information system which is essentially a contractor reporting system. It provides a uniform method to display contract status in financial terms. It establishes basic contractor financial data input for development of budget estimates, financial plans, program change proposals and the contractor's response to the request for proposal (RFP). Also, it provides input to our cost data bank for use in developing cost estimates or conducting cost effectiveness analyses.
- Third is a cost accomplishment system which is an adaptation of Program Evaluation Review Technique (PERT) cost into a system more usable by the contractor and by our system program office (SPO) for program management. It provides for early visibility by the system program office of potential problems, thus avoiding contract overruns.

With the WSELAC and the Management Information System Project, we believe the necessary ground work has been established for improving the System Command's competence for performing system effectiveness and cost effectiveness analyses.

The need for effectiveness analyses in the conceptual and definition phases has been recognized for some time. Our 375 series of regulations and manuals address the matter rather directly. They describe management and engineering procedures to maximize total system/cost effectiveness. It remains for Systems Command to integrate the WSELAC methodology into the appropriate Systems Com-

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APRIL 1966

SPEAKERS CALENDAR

OFFICE OF THE SECRETARY OF DEFENSE

Hon. John M. Malloy, Dep. Asst. Secretary of Defense (Procurement) at Government Contracts Symposium, Orlando, Fla., March 3–4.

William B. Petty, Dir., Defense Contract Audit Agency, at Third Annual Southeastern Government Procurement Symposium, Orlando, Fla., March 4.

Bernard B. Lynn, Dep. for Audit Management, Defense Contract Audit Agency, at American Society for Public Administrators Meeting, Albany, N. Y., March 29.

Brig. Gen. J. H. Weiner, USAF, Chief of Staff, Defense Communications Agency, at Armed Forces Communications Electronics Assn. Meeting, Baltimore, Md., April 12.

Edward T. Cook, Dep. Dir., Defense Contract Audit Agency, at National Contract Management Assn. Symposium, Los Angeles, Calif., April 15.

DEPARTMENT OF THE ARMY

Gen. Harold K. Johnson, Chief of Staff, U.S. Army, at Boston University Distinguished Speakers Series, Boston, Mass., Feb. 24.

Gen. Frank S. Besson, Jr., Commanding General, U.S. Army Materiel Command, at 8th Joint Industry-Military-Government Packaging Materials Handling and Transportation Symposium, Sheraton Park Hotel, Washington, D.C. Feb. 28; at Western Railway Club, Chicago, Ill., March 21.

Lt. Gen. William F. Cassidy, Chief of Army Engineers, at American Congress on Surveying & Mapping/ American Society of Photogrammetry Meeting, Hilton Hotel, Washington, D.C., March 9.

Maj Gen. Austin W. Betts, Dep. Chief of Research and Development, at Rice University, Houston, Tex., March 9.

Maj. Gen. David P. Gibbs, Chief of Communications-Electronics, at Armed Forces Communications Electronics Assn. Meeting, Fort Monmouth, N.J., April 4–6.

DEPARTMENT OF THE NAVY

Hon. Robert N. Morse, Asst. Secretary of the Navy (Research and Development) at Commissioning of USS BROOKE (DEG–1), Seattle, Wash., Feb. 26.

Adm. H. Rivero, Vice Chief of Naval Operations, at National Security Commission, American Legion, Washington, D.C., March 2.

RAdm. H. J. P. Foley, Asst. Chief, Bureau of Supplies and Accounts, at Southern States Regional Traffic Safety Conference, Chattanooga, Tenn., March 9.

VAdm. Charles B. Martell, Dir., ASW Programs, Office of Chief of Naval Operations, at Naval Reserve Assn. Luncheon, Washington, D.C., March 15; at American Society for Quality Control, Los Angeles, Calif., March 22; at NROTC Convocation, Purdue University, North Lafayette, Ind., April 18.

VAdm P. H. Ramsey, Deputy Chief of Naval Operations (Air), at General Dynamics/Fort Worth Management Dinner, Fort Worth, Tex., April 21.

DEPARTMENT OF THE AIR FORCE

Lt. Gen. T. P. Gerrity, Dep. Chief of Staff (Systems & Logistics), at National Security Seminar, Carbondale, Ill., March 31-April 1.

Gen. B. A. Schriever, Commander Air Force Systems Command, at American Society for Public Administration, Washington, D.C., April 14; at American Ordnance Assn. Meeting, Washington, D.C., May 5.

Lt. Gen. R. L. Bohannon, Surgeon General, at Aerospace Medical Assn. Meeting, Las Vegas, Nev., April 18-21.

Maj. Gen. John W. O'Neill, Commander, Electronic Systems Division, Air Force Systems Command, at National Telemetering Conference, Boston, Mass., May 10.

Army Engineers Given Cement Testing Tasks

The Army Corps of Engineers has assumed the function of procurement testing cement for Federal Government agencies, a service previously performed by the National Bureau of Standards.

The job involves sampling and testing cement furnished by contractors for use in construction projects being performed by the Army Department and other Federal agencies including the U.S. Bureau of Reclamation and the Navy's Bureau of Yards and Docks.

Sampling and testing activities have been assigned to three Corps of Engineer field facilities, each of which will serve geographic areas as follows:

North Pacific Div., Army Corps of Engineers, Portland, Ore.—Montana, Wyoming, Utah, Arizona, Nevada, Washington, Oregon and California.

Ohio River Div., Army Corps of Engineers, Cincinnati, Ohio—All states east of, and including, North Dakota, South Dakota and Nebraska and all states north of, and including Missouri, Tennessee and Virginia.

U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.—Colorado, Kansas, New Mexico, Oklahoma, Texas, Arkansas, Louisiana, Mississippi, Alabama, Georgia, North Carolina, South Carolina and Florida.

AF Begins Development of Automatic Field Telephone

Development of an advanced automatic radio telephone system specially adapted for military use in forward areas has been started by the Air Force Systems Command's Electronic Systems Division at L.G. Hanscom Field, Mass.

Designed to be carried manually, the system will have a rugged configuration that will permit it to be air dropped and operated almost anywhere in the world under the most severe weather conditions.

Each system will provide for 14 simultaneous conversations with up to 200 connections over an area five miles in diameter.

Without its battery, each hand set will weigh about 15 pounds while the repeater or nerve center of the system will scale about 100 pounds, distributed into three back packs.

The new design will provide private, high quality voice communications that can be instantly set up, dismantled and relocated in accordance with military requirements.

Present timetable calls for delivery of a prototype by December 1966 to be followed by rigorous field testing to simulate combinations of extreme temperatures, humidity and windblown sand and dust.

NORAD Reorganization To Become Effective April 1

The North American Air Defense Command (NORAD) will undergo an overall reorganization of its Air Force, Army and Royal Canadian Air Force components effective April 1.

The realignment is in consonance with the changing emphasis of the major threat to North America from manned bombers to ballistic missiles and overall improvements being made to the air defense weapons control system.

Revamping of NORAD and its components coincides with the acquisition of an improved back-up interceptor control (BUIC) system. The improved BUIC system is a dispersed, automated weapon control system which, coupled with the semi-automatic ground environment (SAGE) system, increases flexibility of the manned bomber defense and gives greater assurance that sufficient air defense capability will survive a ballistic missile attack to effectively counter the manned bomber threat.

North American Air Defense Command.

The reshuffle calls for the realignment of the six numbered regions into four geographically designated areas to be called Western, Central, Southern and Eastern NORAD regions. The Alaskan NORAD region, headquartered at Elmendorf AFB, Alaska, and the Northern NORAD region, headquartered at North Bay, Ontario, Canada, will be retained. The city-named NORAD sectors will be redesignated as numerical divisions.

New regional sectors, their headquarters and changes to take place follow:

Western NORAD Region, Headquarters—Hamilton AFB, Calif. The new Western NORAD Region will encompass the area and forces of the 28th NORAD Region at Hamilton and the 25th NORAD Region at McChord AFB, Wash.

The 25th NORAD Region, the Reno Sector with headquarters at Stead AFB, Nev., and the Los Angeles NORAD Sector with headquarters at Norton AFB, Calif., will be inactivated and the semi-automatic ground environment (SAGE) facilities associated with these units phased out. These control functions will be transferred to the SAGE facility at Hamilton AFB and to the new BUIC facilities.

Western NORAD Region will consist of the Seattle NORAD Sector which will be redesignated as the 25th NORAD Division; the Portland NORAD Sector, redesignated as the 26th NORAD Division, to encompass the area and forces of the present Reno Sector; and the Phoenix NORAD Sector, redesignated as the 27th NORAD Division, encompassing the area and forces of the present Los Angeles Sector.

Central NORAD Region, Headquarters—Richards-Gebaur AFB, Mo. The Central Region will replace the 29th NORAD Region and will encompass the area and forces now assigned to the 30th NORAD Region at Truax AFB, Wis., which will be inactivated.

Central NORAD Region will be composed of the Great Falls NORAD Sector which will be redesignated the 28th NORAD Division; the Duluth NORAD Sector redesignated the 29th NORAD Division; the Sioux City NORAD Sector redesignated the 30th NORAD Division; and the Chicago NORAD Sector redesignated the 20th NORAD Division.

Southern NORAD Region, Headquarters—Gunter AFB, Ala. The Southern NORAD Region will replace the 32nd NORAD Region, and will be composed of the forces assigned to the Montgomery NORAD Sector, which will be redesignated at 32nd NORAD Division; and the Oklahoma City NORAD Sector, which will be redesignated from the present 29th NORAD Region to the 31st NORAD Division.

Eastern NORAD Region, Headquarters—Stewart AFB, N. Y. The Eastern NORAD Region will replace the 26th NORAD Region. It will be composed of the Washington NORAD Sector, redesignated the 33rd NORAD Division; the Detroit NORAD Sector, redesignated the 34th NORAD Division; the Boston NORAD Sector redesignated the 35th NORAD Division; and the New York NORAD Sector redesignated the 21st NORAD Division.

U. S. Air Force Air Defense Command.

Reorganization of the U. S. Air Force Air Defense Command (ADC) parallels the NORAD structure within the continental United States. ADC will establish four numbered air forces to replace the numbered ADC air divisions and will redesignate the geographically named ADC sectors as numbered air divisions.

Numbered air forces to be established are the 4th at Hamilton AFB, Calif; 10th at Richards-Gebaur AFB, Mo.; 1st at Stewart AFB, N. Y.; and 14th at Gunter AFB, Ala. The commanders of the Eastern, Southern and Central NORAD regions also will command the numbered air force co-located at the same base.

Changing the designation of the sectors to numbered air divisions is being done to make the organization of ADC consistent with the structure of other USAF major air commands such as the Tactical Air Command and Strategic Air Command. The numbers assigned to the ADC air divisions will be identical to those of the NORAD divisions and both will be commanded by the same individual.

U.S. Army Air Defense Command.

The U. S. Army Air Defense Command (ARADCOM) will realign its boundaries on April 1 as part of the overall reorganization of NORAD. ARADCOM will reduce its number of region commands from five to four and will establish new geographical areas of responsibility for three of the regions. Two region headquarters will be moved.

Areas of responsibility of the four ARADCOM regions will conform to boundaries of NORAD regions within the United States.

Headquarters of 1st Region, ARAD COM, will remain initially at Fort Totten, N. Y., and present boundaries will be retained. In the fourth quarter of Fiscal Year 1967, this headquarters will move to Stewart AFB, N. Y., to co-locate it with the headquarters of Eastern NORAD region.

Sixth Region, ARADCOM, will remain headquarters at Fort Baker, Calif., but its area will be enlarged to include 7th Region, ARADCOM, at McChord AFB, Wash. The 7th will be discontinued. The commander of the Western NORAD Region will also be the 6th Region commander.

Second Region, ARADCOM, will keep its headquarters at Richards-Gebaur AFB, Mo. The boundaries of the reconfigured 2nd Region will coincide with those of the Central NORAD Region.

Headquarters of 4th Region, ARAD COM, will be moved from Fort Sheridan, Ill., initially to Maxwell AFB, Ala., and finally to Gunter AFB, Ala. The boundaries of the reconfigured 5th Region will coincide with those of the Southern NORAD Region.

RCAF Air Defense Command.

RCAF Air Defense Command will be affected by the change in boundaries and redesignation of sectors in which units of the Canadian command are located.

FROM THE SPEAKERS ROSTRUM

Excerpts from address by Willis M. Hawkins, Asst. Secretary of the Army (Research & Development), at the Association of the U.S. Army Symposium on Reconnaissance and Surveillance, Fort Huachuca, Ariz., Jan. 26, 1966.

Hon. Willis M. Hawkins

A Need for New Concepts for Surveillance and Target Acquisition

. . . What I propose to do is discuss in a simplified way how I feel the surveillance and target acquisition mission fits into Army operations; to outline for you the status of our current concept efforts; touch lightly on the potential of various technical approaches that have been suggested; and, finally, outline in a very brief way some of the serious responsibilities which the Army, DOD and the industry must assume in order that we can get on with development in a rational fashion.

I hope in this discussion to emphasize one thing and that is the futility of continuing to escalate the gathering of information even though we can conceive of many ingenious ways to sort and display it. We must return to a concept of handling only essential data.

Army System Dependence on Enemy Information.

In trying to discuss the system approach to surveillance and target acquisition, we must remember that the system approach in the Army is somewhat different than the system approach that has been so successful in analyzing strategic systems. . . . I would like to suggest, however, that the Army in its entirety is, in fact, one system and the subsystems which make it up cover a variety of functions and operations in a complex and necessarily flexible manner.

As we turn to the reconnaissance problem and the systems we would like to have to solve this problem, I think we will note that most of these systems actually work in one of two modes. In one case, these subsystems are short lead time closed loop systems and, in the other, the lead times are so great that they are, to a first approximation, open loop arrangements. In order to describe what I mean by the closed loop—open loop breakdown, I would like to discuss first the closed loop type of reconnaissance system. These are the systems that have the following specific purposes:

- The location and description of enemy combat elements.
- Real time fire direction.
- Real time damage assessment.
- Surveillance of combat troop and equipment movement.

You will recognize in this list that I have attempted to seek out those functions where the local commander is immediately responsible for the action and reaction to the information. This is what I call closed loop.

Let us now take a look at what I mean by open loop or long lead systems. In this particular case the systems do the following:

- Define the environment for potential battle including permanent features of geography of the zone of combat.
- Determine the long range potential of the enemy such as the change of his support or relief elements, or the onset of major buildup.
- Locate and describe logistical and facility targets.
- Long range damage assessment.

As you see from a comparison of these two groups, the closed loop portion is characterized by immediate action and reaction resulting from information gained. Open loop is characterized as foundation information for future operation and carefully planned interdiction.

Status of Concept Development.

Keeping in mind the closed loop and open loop groupings that I have just outlined, I would now like to discuss where we stand with respect to our development of concepts. Historically, sensor development has generally lagged vehicle development, if vehicles are involved in the system, and both, unfortunately, have preceded logical overall reconnaissance system concept creation. This has put the commander in a position of having to develop his own systems concepts in the field using the tools at hand. Being ingenious, a number of tactics have been developed, not the least of which is reconnaissance by fire. This is a firm tactical concept and is an extremely useful one. It probably accounts for the lions share of target acquisition in situations such as we are experiencing in Vietnam. The utter simplicity of the concept cannot be denied but certainly the cost in lives and the lack of precision should be a challenge to every technical man. There must be a better way of finding the enemy than standing up to see who shoots at you.

I would like to suggest that those of us, who attempt to work in the concept creation part of the business, might better have spent our time in the past with careful analysis of the field commanders' functions as a starting point for creating surveillance and target acquisition systems. We have to decide the following:

- At what level in the command organization must the quick reaction systems close the loop? I'd like to suggest that we have tended to put this level too high.
- How much raw data does a field commander really need? How much

updated information is required and how often renewed?

- In what form must the information be presented to permit his immediate intelligent absorption?
- How much can a commander absorb in the time available prior to response?
- What staff or subechelons need be in the circuit?
- How much data can they absorb and in what form would it be presented?
- Finally, can some of this information go directly to the gun and attack system—by-passing the commander?

From discussions with many field commanders and analysts who are attempting to simplify total reconnaissance, surveillance and target acquisition requirements, I have evolved four categories of information which may help in breaking the problem down into simpler elements for our future studies. These are:

- Background information.
- Trigger information.
- Spot information.
- Mission direction or support information.

In the background category I would include the availability of accurate maps, the location of permanent targets, buildings, bridges, etc., or location of potential targets such as road intersections. This type of information obviously must include most of the enemy real estate for the purpose of obtaining information for one's own combat tactics, and for the purpose of assessing how the enemy will use his own real estate to support his tactics.

Under the title of trigger information I am suggesting the isolation of the type of information that is needed to alert a commander that something has changed since the last time he assessed his own status vis-a-vis that of his enemy. I have listed this as a particular type of mission for a specific purpose. The purpose is to illustrate that, although this kind of information may be available to the commander by a consistent and persistent updating of his background information, the essential information is the barest fraction of the total which is thereby collected. He must find in this mass of information one essential clue, which more often than not, will be buried and lost. I would like to suggest that we need much more work on intelligent filters, starting right at the source of the intelligence gathering system.

An example of an important fundamental filter that we now use is the individual soldier. He fulfills my concept of a type of trigger reconnaissance system as he functions in his role of individual observer, either on the ground in forward areas or in the air. All the information this observer absorbs through his eyes, ears and even his sense of smell is filtered by him before transmission to the commander, thus simplifying to a great extent the commander's task in attempting to respond properly. It is my purpose, in isolating the trigger concept, to challenge you to think of new types of systems where only the essential information is transmitted to the commander, and he does not need computer systems, staff assistants, electronic war rooms, etc., to sort out the essential information from a constant massive flow of nonessential details.

To support the trigger mission I would like to suggest another function which I have called the spot mission. This, as the name implies, is a detail information-gathering process, directed specifically at an isolated element of enemy information, needed, generally, to fill in the details necessary when the trigger system has alerted the commander to some change, or to verify hypotheses regarding enemy disposition.

The mission direction or support intelligence processes include some that we know well and fulfill reasonably well with our current equipment. These missions include fire direction or the spot area surveillance necessary for airmobile operations to cover landing areas, troop advance, or to obtain information for direction of aircraft ground support missions. Included in this category are the systems aimed specifically at locating friendly forces as required in an evacuation, and as required more and more these days in airmobile operations where troops or equipment need to be moved from one section of battle to anohter by air.

As one can see from the discussion of these categories, they can be related to the closed and open loop types of reconnaissance previously discussed. The background missions are obviously fulfilled by the open loop systems, since the information they bring triggers no immediate response in the commander but provides information only for relatively long range tactical planning.

The other three missions, the trigger, spot and mission direction, you will recognize as tightly closed loops in which the information is demanded by the commander for the specific purpose of forming a basis for immediate reaction. In the trigger and the spot mission areas, I think we have had very little real concept thought and, if my categories are erroneous, I haven't seen any alternative listings which suggest an equivalent simplification of the total problem so that we can conceive of adequate solutions. I think, if all of us will move away from the contemplation of detail systems or elements of systems and try to break down the total problem, we will begin to make sense out of its complexities, and we may have the foundation for a number of new and hopefully effective concepts.

Potential of Several Technical Developments.

Having discussed the generalities of our reconnaissance and surveillance requirements, I would like to discuss briefly how we might use some of our presently developed equipment. But before I do, I would like to emphasize one thing that I sincerely believe. We must all work on some kind of reasonable filter at the source of our target and information acquisition systems, so that the operational commander need not depend on a monstrous computer to analyze, reanalyze and, hopefully, regurgitate intelligent information out of a mass of random data from an uncontrolled proliferation of ingenious independent collection subsystems.

This brings me to the first suggestion of how we might better use our hardware. We now have reasonably effective infrared systems. We have new ones coming along which will seek smaller targets and longer range performance; and, in the radar systems, we have the beginning of a most useful filter—namely the use of MTI (Moving Target Information) systems. I would like to suggest that some kind of correlation between MTI and infrared, or with information from other sources (such as polarization of the radar return, microwave radiometric measurements, and the visible spectrum of the target), might provide the kind of filter

I am talking about. It is obvious that this immediately suggests the vast computer I have just described. What I want to suggest is some sort of "at source" correlation that sends only correlated information to the commander. Another technical scheme, that might be used in some kind of correlative system, is the sampling of air. Devices to do this successfully are beginning to emerge from our laboratories. The importance of such a capability, utilized either by the infantryman or in aircraft, is yet to be determined.

There is one kind of correlation and filter scheme, which is now in development, that illustrates some of the characteristics that I have been explaining. We call it VATLS, or Visual Airborne Target Location System. In this system we use the eyeball and brain of an observer in an aircraft, who utilizes a telescope on an inertial reference platform aided by ground tracking (developed from missile control system). All that is transmitted to the ground is the elevation angle, azimuth, altitude and range, relative to the aircraft, of targets sighted by the observer. The tracking system locates the observing aircraft and closes the loop to determine the accurate location of the target. The system is moderately complex, but it has the extreme advantage of maximum simplicity in data handling in that it relieves the commander of any filtering task. The system, in fact, can relieve the commander of involvement in the weapon system loop, if the system is hooked to the artillery or is used to command support aircraft.

We have many subsystems operating in the field that are not directly linked together for mutual support. Obvious in this area are systems which provide electronic intelligence to a very high and, sometimes isolated, element of command. This information could be classified as "trigger" mission intelligence; and it must somehow be more closely linked to quick response or spot systems which obtain correlation information of different kinds, or, perhaps, directly to weapons.

The consideration of combined systems inevitably brings up the problem of interservice responsibilities in any kind of a tactical operation. In the discussion of these systems, the "federation" suggested by Dr. Fubini, in our discussions over the past few years, seems to me to be a concept in which the potential is very large. The prime danger, in contemplating combined systems, is that we will attempt to so thoroughly integrate all the elements that the resulting system is too complex and, therefore, there can be only one. This reduces the flexibility so necessary on the high intensity battlefield, and even more essential to accomplish intelligence-gathering in low level and counterinsurgency types of conflict. Therefore, in thinking of combined systems, we must be careful not to create unique monsters, but to try to create tactical command systems, which hav ethe potential of a complex combined system or the individual effectiveness of the subsystems as the case determines.

Before closing our discussion of the potential of our present technical capability, I should like to point out the obvious fact that none of the current completed developments have attacked the problem of handling the display, the filtering, or the sorting for easy decision by the commander. I have been emphasizing the desirability of correlating and filtering the information so that he gets only what he needs. We all know how difficult this is going to be. We know that, if asked, he will want flexibility; therefore, he will want some excess information in order to be confident that he has enough. No matter how much filtering we do at the source, we must certainly do something in the area of logical information display to show the combat commander what he needs a lot faster and more clearly. Certainly there is more than we can do beyond worn out maps and crayons. A simple idea here, I believe, will do us a great deal of good.

Specific Responsibilities in Concept Development.

All of us involved in the effort to create the best possible reconnaissance and surveillance systems have individual responsibilities. They obviously can't be defined in such a mannre that there is no overlap, but there are certain areas of responsibilities that are unique to the large organizations attempting to develop these systems. I would like to suggest the following:

• **Army responsibility.** In the Army we have recognized that we are, in fact, the only organization that can write the requirements for these systems. We are the ones who demand the information and who must react to it. So far our definition of these requirements has failed to be a real definition, and we must recognize our responsibility to do something better than the routine listing of everybody's desire for information as a basis for requirements. I have been talking about filters throughout this discussion. I recognize that it is the Army's responsibility to put a filter on its requirements so that those who do the development have a specific problem to attack.

I think the Army, in the development of requirements, should try to set up some experimental operations. We have attempted to develop many detailed military tactics through the use of operational tests, but we have not attacked the surveillance and target acquisition function in any specific operational test. This may be a long program but I think it is an essential one, and we should approach its planning now.

The Army must certainly analyze its security rules to see if we have any information-gathering systems artifically hidden behind closed doors in such a manner that the output is not available for immediate response by operational commanders.

Finally, I recognize that the Army has a distinct responsibility to assemble the best possible concept systems talent, in order to combine many individual technical developments and ideas into operational systems where the combined capabilities of the various technical devices are welded together in optimum ways.

• **Industry responsibility.** For those of you in industry, I think that there are several major responsibilities which you should consider. I would like to suggest that you first look at your gadget peddlers. I know that many of you feel that the Government is peculiarly blind when it comes to looking at new ideas. I felt that way myself when I was in industry. I now have a different view of the problem and I would like to admit that the Government is not all immune to strong sales effort, and it has too often succumbed to clever but actually useless ideas. These ideas rarely come to complete fruition because they eventually die in the light of reason. They have in the process, however, absorbed a substantial amount of talent and attention, and the same technical people could have been creators had

they had a more total look at the problem, and had they spent their ingenuity fulfilling real requirements.

With respect to these real requirements, I think you have another major responsibility since, in many cases, you understand the problem as well as we. This responsibility is the persistent and intelligent questioning of requirements which don't seem logical to you. By the dialogue you start in this area, you may provide analytical insight within the Government to correct errors of concept.

• **DOD responsibility.** Since we have some members of the Defense Department here, who have no direct connection with the Army or the other services but are purely DOD oriented, I should like to suggest a couple of responsibilities, I believe DOD, outside the Services, must pick up over and above the normal function of technical, programming and financial assessment. The Department of Defense must recognize the real, but almost impossible to analyze, advantage of flexibility of missions. No matter how carefully we plan or how thoroughly we organize analysis, the facts of any tactical situation are bound to cause the commander to "make-do," where we have not provided the tactics nor designed the equipment to help him. Therefore, we must avoid, and DOD is the one truly responsible here, the creation of combined unique systems, which exclude overlapping simpler systems and which might be thwarted by events or an ingenious enemy. As an example, and I am picking an obvious example because I only want to illustrate the point, if a supersonic aircraft has infrared capabilities, this doesn't mean that a slower aircraft, helicopter or a drone should not also have it.

The Defense Department can help us in being certain that we do not emphasize too thoroughly tri-service systems. The concepts of such systems, logical though they may be, eventually drive decisions up in the military organization and, in the surveillance and target acquisition business, it seems to me that we must concentrate our efforts in driving the decisions down in the organization in order to keep the information loops tight and closed for quick reaction. Dr. Fubini's concept of federation is a massive step in the right direction, and we hope that the Army can so conceive its subsystems so that they fit well into federated systems of larger capability.

Conclusions.

I believe it is obvious to all of the Services and to the Department of Defense that the reconnaissance-surveillance-target acquisition problem is probably the most complex and most importunate of the technical and tactical problems facing us. I believe that the magnitude of the task has so far confounded all of us in trying to conceive of systems to solve the problem.

I would like to suggest that we all try to categorize our thinking and to discuss the process of breaking the total problem into smaller pieces so that we can think in a more orderly fashion. I have suggested the categories of background, trigger, spot and support systems. I would welcome alternative suggestions which might help us simplify our approach.

Finally, we must all strive to think of the problem in terms of capabilities of the officers, who command tactical units at the lowest level, in order to determine what they need, to recognize what they can absorb and to help them sort out the information necessary for response.

Excerpts from address by Robert H. Charles, Asst. Secretary of the Air Force (Installations & Logistics), to the Graduating Class of the Defense Weapon System Center, Wright-Patterson AFB, Ohio, Dec. 10, 1965.

Hon. Robert H. Charles

System/Project Management

* * * * * * * * *

I don't have to tell you that the scientific and technological, as well as the economic and industrial aspects of national security, are in an era of revolution. Since World War II and, particularly during the past decade, the Defense Department has had to develop new management techniques and attitudes to match this revolution. Beginning with the management system set up to bring the ICBM into operation, and later the Polaris, the system/project manager device has evolved to the point where it has been accepted and adopted throughout the DOD—and in other agencies as well—to handle the larger and more complex acquisition programs.

The presence of students from all the Military Services, as well as from National Aeronautics and Space Administration, Federal Aviation Agency, Canada and defense industries attests to the increasingly widespread use of this management technique. The old "tried and true" methods of management have been replaced by new tools and techniques. Defense managers now use such terms as systems analysis, simulations, etc. Any meeting of systems managers now includes the dropping of such phrases as "critical path analysis," "PERT," "real time," "information retrieval," etc.

Here, I would like to insert several words of warning. First, I urge that we all avoid, at almost any cost, what I will call the priesthood syndrome. All professionals are fair prey to this phenomenon. As a former lawyer, I know. We lawyers like to drop terms like "certiorari," particularly among people that we are trying to impress with our enomous fund of knowledge. It invests us with a feeling of superiority and makes our hushed listeners quail with insecurity. And in engineering, the newest priesthood, there is no lack of guilt. They often compound the felony by abbreviation. The degree by which the lift of an airfoil exceeds its drag—parasite or induced—is simply L over D. FEBA (Forward Edge of the Battle Area) is another, although this is hardly an engineering term. And this simplicity is fine if the term is understood. . . .

Another thing, let's try to keep things manageable in terms of numbers of people. The project manager system won't fly if it gets too heavy. The original idea, and a good one, behind project management was to streamline the process by cutting through functional layers. But a large

fat instrument rarely cuts through anything. Yet with each new project, our System Project Offices (SPO) get bigger. If we aren't careful, we will become the victims of Parkinson's fourth and newest law, namely: "Any group of 1,000 or more generates enough activity within itself that it needs no contact with the outside world."

I have been flippant on this subject, but there is a serious side to it. As we seek to impose more responsibility on our industrial contractors, through fewer cost type contracts and with terms arrived at in competition, we must descipline ourselves to couple that responsibility with the authority needed to carry it out.

Responsibility and authority are twins and, if we require industry to accept responsibility, we must not withhold the authority to fullfill it. You may have heard of the "total package" concept with which we are experimenting on the C–5A program and which, if successful, we intend to apply to other programs such as the Short Range Attack Missile (SRAM). Stripped to its essentials, the total package plan is intended to permit the award of contracts competitively, where performance and schedule are related to cost, and on a basis of total responsibility. These are the key words. We in the Government have for many years been living in an atmosphere of "cost-plus and sole source," where more controls by the customer are needed; and this relinquishment of authority will, for many, be a shocking experience. But it must be done if we are to get the best results—performance, schedule and cost—from our industrial partners; and you are the ones who will have to do it.

While methods change, and nations change and world situations change, there is one constant—the need "to provide for the common defense"—the need to protect the substance of past achievements and the means for future accomplishments.

The great challenge before us lies in managing our resources in such a way as to derive the maximum benefits from the application of science and technology to our defense needs. A major share of this management task falls on the system/project managers.

Our national security depends on our ability to act effectively through the entire spectrum of conflict, whether it is confined to the psychological-political-economic area, whether it brings on a number of "brush fire" wars, or whether it bursts into a major non-nuclear or into an all-out general war. I think it is fair to say that the danger of general nuclear war is receding, largely because of the strength and readiness of our strategic forces. At the same time, the danger of lesser conflict—the euphemistic "war of liberation"—is increasing.

A few months ago, there was an article written by Lin Piao, Vice Premier of Red China. That article states quite frankly not only what Peking's intentions are in Asia, not only what Peking's intentions are in Vietnam, not only what Peking's intentions are toward the United States, but what Peking's plans are for the expansion of world communism.

Lin Piao makes this interesting point. The Chinese Communist revolution differs from the Russian revolution in one essential respect. The Russian revolution "began with armed uprisings in the cities, and then spread to the countryside," he notes, "while the Chinese revolution won nationwide victory through the encirclement of the cities from the rural areas and the final capture of the cities."

And here is the kicker: the "rural areas of the world" today, Lin Piao asserts, are Asia, Africa and Latin America. The "cities of the world" are North America and Western Europe.

Just as communism in China succeeded by first capturing the countryside, then encircling and absorbing the cities, so will the global communist movement ultimately succeed first by capturing Asia, Africa and Latin America, thereby encircling North America and Western Europe. Then, says Lin Piao, the United States and its allies will be ready for annihilation.

And where is all this to begin? It has already begun, he replies. That place is in Vietnam. Vietnam, he says, is the "focus" of the revolutionary movement. No matter what action the United States may take in Vietnam, he insists, the Communist Chinese are "unshakable" in their determination to drive the United States out of Southeast Asia.

Lest anyone doubt that the North Vietnamese disciples are taking cues from their Chinese mentors, we have this recent statement of General Giap, the experienced leader of North Vietnam's army: "If the special warfare that the U.S. imperialists are testing in South Vietnam is overcome," he says, "then it can be defeated everywhere in the world."

Obviously, we must be prepared for a variety of contingencies in this troubled world. While this country can afford whatever is needed for defense, we cannot afford to waste any of our resources. This is why systems management is so vitally important, and why the roles which you will play in the years ahead will be decisive.

Within a few days you will start again on the daily collision course with the problems of men and resources. From now on, throughout your careers, you will have progressively greater responsibilities in the direction of man and the use of material. I would caution you about only one aspect of your responsibilities—that of overmanagement. By this I mean, not only overcontrol of industrial contractors, to which I referred earlier, but also any rigidity of control of the actions of the subordinates and of the functions under your direction. The loss of an Army mule a few decades ago was a serious business—Lincoln said they were more expensive to replace than generals. But the loss of a mule then does not compare with the loss of one of today's prime movers. The same ratio applies to every item of equipment throughout the military establishment.

It is common experience to learn more from our mistakes than from our successes, for painful errors sharpen the senses while triumphs can dull them. You would not be in this class if you were not able to profit from your errors, and it is highly possible that you would not be here had not a superior somewhere along the line judged you worth saving, despite at least one real blooper. I ask that, as you move into the upper echelons of your Services, you do likewise with juniors who are worthy of the effort. Let them learn from mistakes in positions of lesser responsibility so that they will make fewer when they are in the senior councils where the cost of errors is astronomically higher.

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MEETINGS AND SYMPOSIA

APRIL

Conference on Ground Based **Aeronomic Studies of the Lower Ionosphere,** April 11–15, at the Defense Research Telecommunications Establishment (DRTE), Ottawa, Canada. Co-sponsors: Air Force Cambridge Research Laboratories and DRTE. Contact: W. Pfister (CRUB), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass. 01731, (Area Code 617) CR 4–6100, ext. 3019.

Symposium on **Generalized Networks,** 14th in a series of international symposia organized by the Polytechnic Institute of Brooklyn Microwave Research Institute, April 12–14, at New York City. Sponsors: Air Force Office of Scientific Research, Office of Naval Research, Army Research Office, Society for Industrial and Applied Mathematics and the Institute for Electrical and Electronics Engineers. Contact: Lt. Col. E. P. Gaines, Jr. (SREE), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave., S.W., Washington, D.C. 20333, (Area Code 202) OXford 6–3671.

Fourth Symposium on **Remote Sensing of Environment,** April 12–14, at the University of Michigan, Ann Arbor, Mich. Co-sponsors: Air Force Cambridge Research Laboratories and Office of Naval Research. Contact: C. E. Molineux (CRJT), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass. 01731, (Area Code 617) CR 4–6100, ext. 3620.

Twentieth Annual **Frequency Control Symposium,** April 19–21, at the Shelburne Hotel, Atlantic City, N.J. Sponsor: Army Electronics Laboratories. Contact: M. F. Timm, Solid State & Frequency Control Div., Army Electronics Laboratories, Fort Monmouth, N.J., (Area Code 201) 5–1728.

Mathematical Aspects of Computer Science, dates undetermined, at New York City. Sponsors: Air Force Office of Scientific Research, Army Research Office-Durham, Institute for Defense Analysis, Association for Computing Machinery, Association for Symbolic Logic and the American Mathematical Society. Contact: Capt. J. Jones, Jr. (SRMA), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave., S.W., Washington, D.C. 20333, (Area Code 202) OXford 6–1302.

MAY

Symposium on **Electrode Processes,** May 1–6, at Cleveland, Ohio. Co-sponsors: Air Force Office of Scientific Research and the Electrochemical Society. Contact: Lt. Col. M. D. Sprinkel (SRC), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave., S.W. Washington, D.C. 20333, (Area Code 202), OXford 6–8706.

Bionics Symposium 1966, May 3–5, at the Sheraton Hotel, Dayton, Ohio (rescheduled from March). Co-sponsors: Aerospace Medical Research Laboratory and the Avionics Laboratory. Contact: Dr. H. L. Oeistreicher (MRBAM), Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio, (Area Code 513) 253–7111, ext. 3–6108.

Ninth **Navy Science** Symposium, May 5–6, at Departmental Auditorium, Constitution Ave., between 12th and 14th Streets, N.W, Washington, D.C. Sponsor: Office of Naval Research. Contact: Robert J. Mindak, Conference Chairman, Office of Naval Research, Department of the Navy, Washington, D.C. 20360, (Area Code 202), OXford 6–4720.

JUNE

Electromagnetic Windows Symposium, June 1–3, at the Georgia Institute of Technology, Atlanta, Ga. Sponsor: Air Force Avionics Laboratory. Contact: R. Ireland (AVWE–3), Air Force Avionics Laboratory, Wright Patterson AFB, Ohio 45433, (Area Code 513) 253–7111, ext. 5–5720.

Fifth U.S. National Congress of **Applied Mechanics,** June 14–16, at the University of Minnesota, Minneapolis, Minn. Sponsor: Air Force Office of Scientific Research, Office of Naval Research, Army Research Office, American Physical Society, American Society of Civil Engineers, American Society of Mechanical Engineers for Experimental Stress Analysis, American Institute of Aeronautics and Astronautics, American Mathematical Society, Society for Rheaology and American Society for Testing and Materials. Contact: Maj. Lawrence P. Monahan, Jr., Army Research Office-Durham, Box CM, Duke Station, Durham, N.C. 27706, (Area Code 919) 286–2285.

International Conference on Crystal **Growth,** June 20–24, at Boston, Mass. Sponsor: Air Force Cambridge Research Laboratories. Contact: Mr. Charles S. Sahagian (CRWPC), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Mass. 01731, (Area Code 617), CR 4–6100, ext. 3298.

Second Rochester Conference on **Coherence and Quantum Optics,** June 22–24, at the University of Rochester, N.Y. Co-sponsors: Air Force Office of Scientific Research and the Air Force Cambridge Research Laboratories. Contact: Dr. M. C. Harrington (SRPP), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave., S.W., Washington, D.C. 20333, (Area Code 202) OXford 6–4464.

Cold Spring Harbor Symposium on **Quantitative Biology,** dates undetermined, at Cold Spring Harbor, N.Y. Sponsors: Cold Spring Laboratory for Quantitative Biology, Air Force Office of Scientific Research, National Institutes of Health, National Science Foundation and the Atomic Energy Commission. Contact: Dr. R. V. Brown (SRLA), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave. S.W., Washington, D.C. 20333, (Area Code 202), OXford 6–4181.

Trends in System and Cost Effectiveness Analysis

(*Continued from Page 10*)

mand management and engineering documentation, but first we must verify and validate these procedures. This is being accomplished on selected systems representing each phase of the weapon system life cycle. The techniques must be refined and improved; a better data base must be established; and, as weaknesses are recognized, research to plug the gaps must be initiated.

Above all, we must insure a methodology of effectiveness analysis which avoids the danger of discouraging the Air Force and the DOD from approving daring program approaches, since these alone can give us the quantum gains in military capability which are so vital to our national survival.

Subcontracting Program Spreads Defense Dollar Nationwide

When the Defense Department spends a dollar toward building modern weapons systems, little pieces of that dollar go into virtually every state in the nation affecting the economy of thousands of cities, towns and communities. An example of the spread of defense dollars throughout the land is the history-making subcontracting programs of the Lockheed-Georgia Co. of Marietta, Ga., a division of Lockheed Aircraft Corp., which is prime contractor for the latest giant cargo-troop carrying aircraft for the U.S. Air Force—the C–141 Starlifter and the C–5A.

The money being spent on these two aircraft—the total for airframes exceeds $2 billion (the engines, contracted separately to other firms, exceed $1 billion)—isn't concentrated in the town of Marietta, Ga. Most of it fans out across the country to subcontracting firms—large aerospace corporations, small businesses and companies in labor surplus areas, who build large chunks of the new planes; or to vendors, who provide nuts and bolts, etc. Of the amount which the Marietta company retains "in house," it places some in its own sub-assembly plants located, or being located, in Appalachia areas and elsewhere, and buys much raw material from other Georgia firms and companies in other states.

It is impossible to determine how many people make a living, or part of their living, from the Defense Department's programs on these two aircraft—one of which is in full production and the other just preparing to go into production. Twenty-two thousand employees of the Lockheed-Georgia Company come from half of the 159 counties of Georgia. This figure also includes about 150 in a sub-assembly plant in Clarksburg, W. Va., and 300 or more in a sub-assembly plant at Charleston, S.C. Additional sub-assembly plants will be opened in Shelbyville, Tenn., Martinsburg, W. Va., Uniontown, Pa., and Logan, Ohio.

Lockheed can count 1,200 companies involved in the C–141 program. It currently is conducting, with Air Force review, competitive bidding to select subcontractors for the C–5A, an aircraft twice the size and twice the cost of the C–141.

Major subcontractors and subsystems contracts on the Starlifter are shared by 33 companies over the United States. Whatever the total of the employees of the subcontractors and vendors, who draw their paychecks from funds derived from the C–141, it can be multiplied by five to give a truer estimate of the number whose livelihood is affected by this defense program. This is because in the communities involved there are grocers, clothiers, furniture dealers, realtors, barbers, gasoline service station operators, car dealers, appliance dealers, etc., who feed, clothe, house and, generally, care for the needs of those who are working specifically on defense contracts.

So, when a dollar leaves Washington, it travels far and wide as it involves thousands in building a weapon system for the Defense Department.

Examples of the Flow of the Defense Dollar in Subcontracting Programs.

After receiving the prime contract on the airframe of the C–141 from the Air Force Systems Command's Aeronautical Systems Division, Lockheed's plant in Georgia sublet the wing to Avco Corp. in Nashville, Tenn., in competitive bidding. The wing includes a fuel pump. The Tennessee subcontractor, Avco, obtained the fuel pump from Pesco in Bedford, Ohio. To build the fuel pump, Pesco needed, among other things, a switch and a cannon plug. The Ohio firm bought the switch from the Micro Devices Co. of Dayton, Ohio, and the cannon plug from a concern in Los Angeles, Calif.

At this point, the defense dollar really begins to flow into communities over the United States. Micro of Ohio gathers components for the switch from the following areas: wire, from Westbury, N.Y.; glass, Shanton, Conn.; electrical material, Chicago and New York; disc, Cincinnati, Ohio; springs, Cincinnati; ceramics, Paramoit, Calif., and Sun Prairie, Wis.; epoxy, Canton, Mass.; and silver from New York City.

The Los Angeles firm providing the cannon plug for Pesco's fuel pump follows a similar pattern in obtaining components from companies spread out over the nation.

Thus, the dollar for the Starlifter wing travels over Georgia, Tennessee, Ohio, California, New York, Connecticut, Illinois, Wisconsin, Massachusetts and other states.

A tracing of the path of the defense dollar through the subcontracting and vending program involving other parts of the Starlifter would find it in virtually every state going from prime contractor to major subcontractors into the third and fourth levels, to vendors and suppliers ad infinitum.

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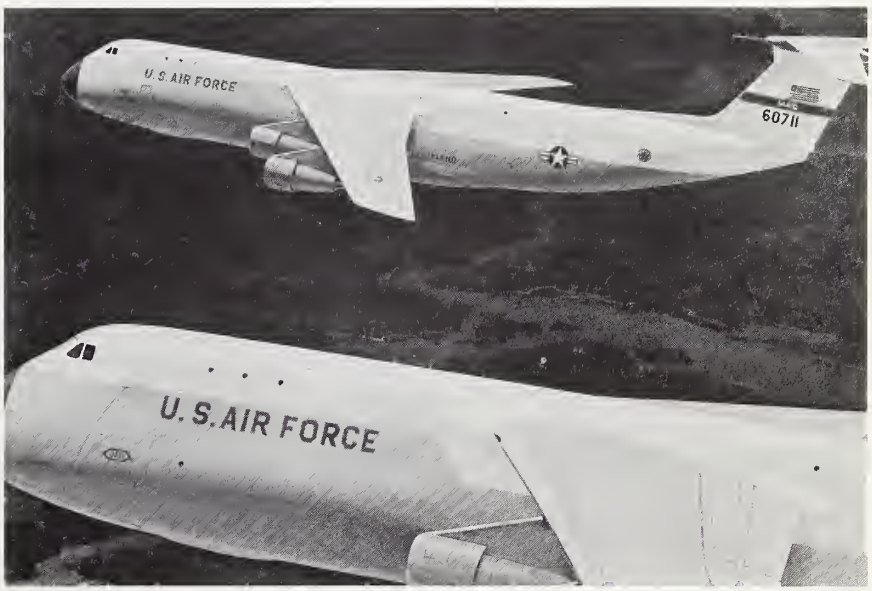

The U. S. Air Force's C-5A will present a rather sleek appearance when it goes into operation in 1969, as this artist's concept of two of them in flight indicates.

Changes in the Army Aviation Program

by
Col. Delbert L. Bristol, USA
Dir. of Army Aviation
Office of Ass't. Chief of Staff for Force Development

The increasing use of aviation in Vietnam has brought about an unprecedented expansion and change in the Army aviation program. The requirements for aircraft and aviation personnel have increased greatly and it may be that these requirements will increase even further before reaching a new plateau. The other changes can be attributed to a Department of the Army study which identified the "Aviation Requirements for the Combat Structure of the Army," commonly referred to as ARCSA. This study has been approved by the Secretary of the Army and is under review by the Office of the Secretary of Defense. Portions of the study have already been approved and are in the process of implementation.

The ARCSA study group made an exhaustive study of Army aviation requirements to satisfy each of the major functions of ground combat, i.e., command and control, reconnaissance and surveillance, fire support, maneuver and logistics. In addition, the management, maintenance and other aviation support requirements of the Army were examined in sufficient detail so as to provide a basis for developing a complete "package." Underlying the study of each functional area was the premise that no aviation support was required unless it could be proven otherwise. Where aviation support requirements were identified, only those necessary for the satisfaction of sustained requirements were recommended to be organic to units with the balance of the support requirements being pooled at some higher echelon of Army command where aviation support could satisfy several "customers" without sacrifice in responsiveness.

After completing analysis of the functional area requirements, the ARCSA study group examined the integrated aviation support requirements at every echelon from the division, corps, field army and the communications zone upwards through the theater of operations level. In these analyses interactions between the requirements of the various functional areas were examined in order to strip out any duplications of capabilities. As an example, it was found that significant interaction occurs between aviation required for maneuver and aviation required for logistics purposes. The aviation required for maneuver purposes within a corps, for example, is sized primarily to meet the simultaneous lift requirements of a particular combat formation. Examination of the frequency of lift of these corps combat formations reveals a surplus of flying hour capabilities that can be devoted to battlefield logistics resupply in the same geographical areas.

By virtue of this surplus capability a compensating reduction can be made in the aircraft requirements developed to move supplies in support of the combat formations.

In sum, the ARCSA study makes extensive recommendations for the revision of aviation in the Army combat structure and in the supporting forces. These changes, coupled with the rationale for the provision of aviation as developed in the study, provide a new statement of requirements for budgetary and planning purposes. To the degree approved by DOD these changes will be incorporated in the affected units and activities as rapidly as possible. In addition to the changes in aircraft authorizations, related changes will be made in personnel authorizations based upon the recently approved aviator requirements study. Revision of the aircraft maintenance organizations is also planned based upon the good features of the ABC maintenance concept (as tested by the 11th Air Assault Division and the 10th Air Transport Brigade) and the experiences of aviation units in Vietnam. Revisions of Tables of Organization and Equipment will also incorporate air traffic control elements in divisions to work in coordination with Army air traffic control companies as recommended by a Combat Development Command study.

Although divisions (other than the airmobile division) will not have organic fixed wing aircraft, they will be provided with personnel and equipment to establish fixed wing air strips within the division area so as to provide termini for logistics resupply, courier and other administrative fixed wing traffic.

The aircraft recommended for the infantry and airborne divisions total 88. The aircraft complement of the armored and mechanized divisions total 57 each.

The U. S. Army's Chinook troop and cargo helicopter in operation by the 11th Air Assault Division.

The organization of corps and Army aviation companies is to be revised substantially so as to provide pooled aviation resources to serve the requirements of units located in the corps area, field army area and communications zone, as well as to reinforce divisions and other units having organic aviation.

The extensive nature of the changes recommended by the ARCSA study will undoubtedly generate heated reactions in some quarters in that this study represents a "bare bone" rather than an "optimum" statement of requirements for Army aviation. Nevertheless, the study does represent the best possible assessment in the light of present-day knowledge geared to the other forces of the Army. On this basis the study provides a more solid foundation upon which the distillation of new experience and increased knowledge can be applied.

Despite the numerous changes recommended by the ARCSA study, the overall quantitative requirements for aircraft and personnel to support the recommendations represent only minor changes from objectives previously stated by the Army.

The other major change during the past year was the creation of an airmobile division. Many lessons were learned from the air assault tests. One of the first things learned was the division's logistical impact and the amount of tonnage that would be handled. The average daily consumption for the division was 555 tons as compared to 450 for an infantry division. The main reason for the increase in tonnage is the requirement for additional aviation fuel.

During Air Assault II we consumed almost three million gallons of POL. Total tonnage consumed was over 18,000 tons. Movement of this tonnage required 10,000 aircraft sorties, half of which were flown at night. The exercise showed that air lines of communication can be established in the combat zone and sustained over long periods of time to support an airmobile division. We also established that the speed with which an airmobile division can accomplish its mission indicates that it will consume 50 percent less tonnage than an infantry division on a similar mission.

Another lesson learned from the air assault tests was the Army's capability to maintain the large numbers of aircraft. This was accomplished with flying colors. The large Chinooks were exposed to field conditions for the first time on a large scale and were available 60 percent of the time. The Mohawk had almost 80 percent availability. The UH–1's, the workhorse of the division, attained the rate of 85 percent. All of the availability rates exceeded the Department of the Army's standards.

The question of sustainability was another unknown. During Air Assault II, aircraft of the division flew 30,000 hours and not a single operation had to be cancelled because of lack of aircraft. The performance and utilization rates were exceptionally high and indicated that aircraft can be operated on a sustained basis. As an example, the Hueys, on the peak days required, got up to 9-10 hours in one day. The average crew flew about 200 hours during the two months of extensive field testing. This utilization compares favorably with that of ground vehicles.

U. S. Army combat soldiers help remove a ½-ton carrier, the Army Mule, which was lifted up by a UH-1D helicopter.

Another big question in many peoples' minds was that of the vulnerability of the helicopter. We have conducted elaborate experiments at the Combat Development Command Experimentation Center. The most important finding is that relatively slow, low flying aircraft are less vulnerable to visually sighted weapons than earlier analytic estimates and opinions had indicated. Statistics from Vietnam offer impressive proof of the helicopter's survivability. The statistics based on about 766,000 combat sorties reveal that a helicopter will be hit by ground fire once in every 325 combat sorties; it will be downed only once in every 6,400 combat sorties; and it will be lost to ground fire only once in about 13,000 sorties.

Another area investigated was that of interface with the Air Force.

I would like to dispel the notion that an airmobile division reduced the Army's requirement for support from the Air Force. Both the Army and Air Force have logistical roles in the air lines of communication which are complementary. The air lines of communication are divided into wholesale operations—bulk delivery to the logistical base, and retail operations —tailored loads delivered to the user. The Army is primarily responsible for the retail delivery, while the Air Force is responsible for the wholesale delivery.

The Air Force allocated 30 sorties per day for close air support during the Air Assault II exercise. The need for extensive Air Force support of airmobile operations was clearly revealed. The division cannot operate adequately without the support of Air Force fighter bombers for close support, reconnaissance aircraft for deep intelligence-gathering missions and transport aircraft for wholesale delivery of supplies. The Air Force provided excellent support in all of these categories during Air Assault II and it is continuing to do so in South Vietnam at the present time.

Mr. McNamara's approval in June of the 1st Cavalry Division (Airmobile) as one of our regular 16

(*Continued on Page 42*)

The Planning and Management of the Navy RDT&E Program

Capt. B. H. Andrews, USN
Dir., Exploratory Development Division
Office of Naval Material

The Navy's Research, Development, Test and Evaluation (RDT&E) Program amounts to something in the order of one and one half billion dollars annually. It involves seven major Navy bureaus and offices, some two dozen major in-house Navy laboratories, several score more Navy field facilities and activities, and thousands of contractors, universities, consultants and other non-DOD resources.

Program Categories and Organizational Responsibilities.

The basic organization of the Navy Department is depicted on Chart 1. Each of the offices shown have certain responsibilities for parts of the Navy's RDT&E program.

The key office in this chain is the Assistant Secretary of the Navy for Research and Development—ASN(R&D). His charter is simple, direct and powerful:

> Establish policy, exercise management and control of, direct and supervise all Department of the Navy research, development, engineering, test and evaluation matters, including general management of the appropriation "Research, Developmnt, Test and Evaluation, Navy."
>
> The ASN (R&D) is the only naval civilian executive assistant currently assigned as manager of an appropriation.

Chart 2 shows the principal offices through which the ASN(R&D) works.

A fundamental principle which governs the Navy RDT&E business is found in the user-producer relationship as it is set forth in the Navy General Order No. 5. In essence, the operational forces and components of the Navy and the Marine Corps are the users and all other activities are the producers.

It is the users' responsibility to state their requirements and to select the means of satisfying these requirements from the body of alternative proposals which may be offered by the producers.

It is the responsibility of the producers to formulate and to execute RDT&E programs which are responsive to the stated needs.

The operation of this user-producer relationship is best exemplified through a brief analysis of the program categories contained in DOD numbered program 6 (RDT&E):

6.1 Basic Research.
6.2 Exploratory Development.
6.3 Advanced Development.
6.4 Engineering Development.
6.5 Management and Support.

The coupling dialogue between users and producers varies from nearly zero to one hundred percent in this progression from research to systems hardware development. The degree of explicitness with which RDT&E effort can be related to operational requirements varies in the same fashion.

At one end of the spectrum lies basic research. The Naval Research Program seeks new knowledge which may be usefully exploited toward the solutions of future problems either known to exist or which are so far in the future as to be yet unvoiced and undefined. This program is formulated and prosecuted under the Chief of Naval Research (CNR). The relevance of the program content to the Navy's operational requirements is broadly implicit, and there is little direct influence exerted upon the program content by the user components. Naval Research accounts for approximately 10 percent of the Navy's total RDT&E effort.

Exploratory Development is a little farther along the chain. This program seeks to exploit research knowledge by the development of advanced techniques and by generally extending the state of the art in technologies across the board. Through this program is gained the technological know-how which stimulates the conceptual design of highly advanced systems and components. The Navy's Exploratory Development Program is formulated and prosecuted under the Chief of Naval Development (CND). The bulk of the program lies in the major producer complex called the Naval Military Support Establishment (NMSE), consisting of the four principal material bureaus with their laboratories and field activities, operating under the Chief of Naval Material (CNM). Exploratory Development accounts for 20–25 percent of the Navy's total RDT&E effort.

In distinct contrast to the Navy Research (6.1) and Exploratory Development (6.2) categories, the Advanced Development (6.3) and Engineering Development (6.4) programs are very specific hardware development programs pointed towards satisfying a specifically identified Navy operational requirement. These two programs are planned, funded and managed on a line item project basis. The user selects the work to be undertaken and evaluates the product from the standpoint of its military worth. The producer is charged with technical and business management of the effort. The differences between categories 6.3 and 6.4 projects lie mainly in the relative degrees of tech-

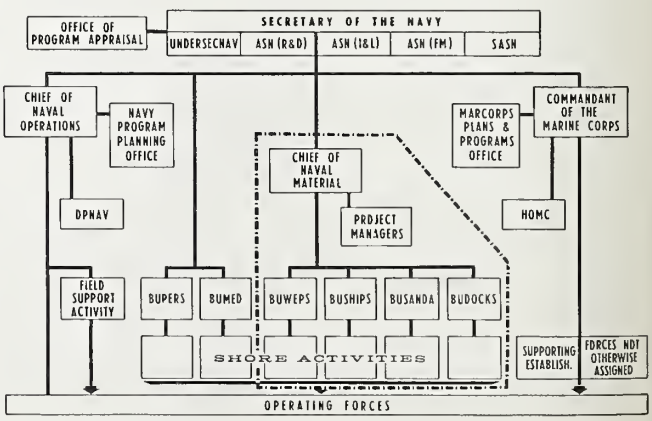

Chart 1.

nical risk, certainty as to military acceptability and implied commitment to subsequent procurement. The user-producer relationship is obviously quite close in these programs. Over 50 percent of the Navy total RDT&E funding is expended in these two categories of effort. The remaining category, Management and Support (6.5), covers general supporting items such as laboratory facilities, test ranges and the like.

Referring again to Chart 2, the responsibilities of the several offices reporting to ASN(R&D) are now clear:

- The Chief of Naval Research is his principal adviser with regard to the Naval Research Program.
- The Chief of Naval Department is his principal adviser with regard to the Exploratory Development Program.
- The Chief of Naval Operations and Commandant of the Marine Corps are his principal advisers with regard to the Advanced Development, Engineering Development and Operational Systems Development Programs.

The Planning Process.

The Navy RDT&E program planning process is part of a larger operation called the Navy Planning System. Although this is a formalized and intricate process, it has carefully provided for flexibility to meet changing circumstances quickly and effectively. Long range R&D planning is pointed not toward freezing future systems designs into today's technologies, but rather toward advancing current technologies in directions that will provide the greatest range of options for future system design concepts.

There is a progressive series of documented planning steps which forms a two-way and continuous communications path between the users and the producers, and the language which is used progresses from quite broad to very specific as one moves along this path from research to hardware development. Chart 3 depicts the general processes involved. This idealized chart does not, of course, show the constant interplay that goes on among all the levels and which makes the whole process a highly iterative one, as indeed it is and must be.

Each of the documents referred to on Chart 3 has a well defined nature and purpose which need not be described here except in a general sense.

Analysis of national objectives and national policy, DOD guidance, Joint Chiefs of Staff plans, Navy missions, etc., leads to a series of Navy planning documents which cover current, mid-range (up to 10 years) and long range (up to 20 years) Navy force levels and operational capabilities.

From these are developed General Operational Requirements (GOR's)—broad mission-oriented statements of required operational capabilities. These form the basic guidance for the Research and the Exploratory Development Programs. As basic knowledge and new techniques are acquired, various possible systems concepts take shape. The remainder of the planning process consists of a series of interchanges between the users and producers of proposals, analyses, tests, cost effectiveness evaluations, etc., culminating in final systems selection for prototype service testing and ultimate procurement.

Program Control.

The nature and degree of program control differs sharply with the program category.

Both Naval Research (Category 6.1) and Exploratory Development (Category 6.2) are essentially fund-level controlled programs. They represent a calculated policy decision to invest a certain portion of available RDT&E funds in broad scientific and technical work in order to develop what might be called a technological bank account against which the requirements of future systems concepts and designs may be pursued.

The principal aim of the Chief of Naval Research and the Chief of Naval Development in these program categories is maintaining, with limited resources, a sound balance of effort across the spectrum of potentially applicable fields.

This requires consideration of many factors, such as current and future operational requirements; assured capabilities and deficiencies; the relative urgencies and priorities of needs; an understanding of the sciences and techniques which are most likely to contribute solutions to existing or future problems; and many others. In addition, these programs must remain flexible and must not be permitted to stagnate. The ability to pursue new ideas and approaches must be preserved. If new work of promise is to be undertaken, it can only be accommodated by terminating other work of less promise, or by moving other work into a different category for further exploitation, as appropriate. However interesting and challenging a proposal may be from a scientific point of view, it is the

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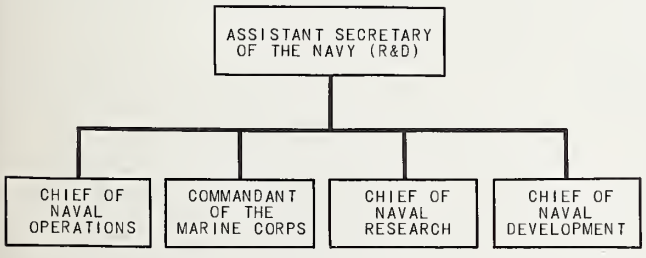

Chart 2.

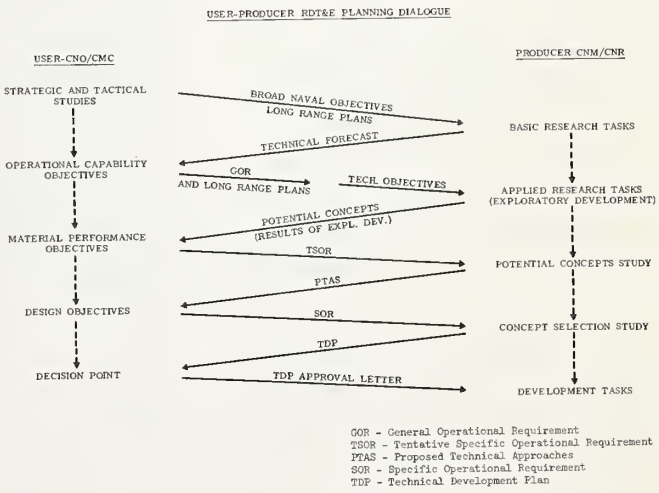

Chart 3.

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DOD Instruction 7700.4, "Reporting Requirements of the DOD Program of Contractor Performance Evaluation (Development and Production)," Dec. 7, 1965. Reissues DOD Instruction 7700.4, dated Aug. 8, 1963, to broaden its scope in the development categories and to include certain production contracts that follow or are concurrent with the development contracts that are evaluated.

DOD directives and instructions may be obtained from:
Publications Distribution Branch
Office of the Secretary of Defense
Room 3B 200, The Pentagon
Washington, D. C. 20301

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Government research and development reports are available to science and industry at price indicated from:
Clearinghouse for Federal and Scientific Information
Department of Commerce
Springfield, Va. 22151
Authorized DOD contractors and grantees may obtain these documents without charge from:
Defense Documentation Center
Cameron Station
Alexandria, Va. 22314

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potential applicability of the work to some Navy need that normally must prevail.

A continuing and careful program appraisal effort is obviously required to keep both of these programs healthy and most effectively responsive.

The control exercised over the hardware programs in the Advanced Development (Category 6.3) and Engineering Development (Category 6.4) is quite different.

Each year, the users (the Chief of Naval Operations and the Commandant of the Marine Corps) are offered many new ideas and concepts for systems which could be of operational value. Each of these is carefully studied with consideration as to priority, urgency, technical risk involved, potential military worth, implied costs and other commitments, and the like. The users then select the work to be undertaken within the funds which are expected to be available.

Each project thus selected becomes a separately budgeted and programmed line item.

Each of these projects is subject to continuous and detailed review of technical progress, cost, adherence to schedule, etc., and a monthly performance evaluation (MPE) report is submitted by the cognizant bureau to keep the user and the ASN(R&D) informed as to status and problems.

Program Execution.

The management which is given to RDT&E effort depends largely upon the nature, the magnitude and the relative importance to the Navy of the work involved.

Each of the in-house laboratories is provided with a reasonable amount of "foundational" money. These are funds from the Research (6.1) and the Exploratory Development (6.2) categories which are made available to the laboratory directors for work of their own selection. There is little or no direct management of these funds above the laboratory level except for post facto review of the quality and the results of the effort, and a minimal degree of guidance to avoid undesirable overlapping of work among the laboratories.

The remainder of the Naval Research (6.1) effort is prosecuted through the Office of Naval Research under the broad program guidance, supervision and fiscal control of the scientific offices of that organization. Much of this category of effort is conducted by universities and private industrial research organizations.

The remainder of the Exploratory Development (6.2) program is prosecuted through the several bureaus and offices under the coordination and control of the Chief of Naval Development. Most of this effort is prosecuted through the two major material bureaus (Bureau of Naval Weapons and Bureau of Ships) and the several established project offices of the NMSE, and is coordinated and directed by the Deputy Chief of Naval Material (Development) who exercises both program and fiscal control. Exploratory Development work is about evenly split between the in-house laboratories and industry.

Essentially all of the Systems Development effort (Categories 6.3 and 6.4) is prosecuted through the material bureaus of the NMSE and the various project offices under the broad policy control and technical supervision of the Chief of Naval Material. While a substantial systems development effort is prosecuted by the in-house Navy laboratories, the majority of such work is carried out through contracts to industrial organizations throughout the country.

This article could only hope to give a very simplified view of what is a most complex operation.

For those who would care to know more, complete information on this subject is contained in a two-volume series entitled "Department of the Navy RDT&E Management Guide (NAVSOP–2457)," available from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402. The price is 60¢ for Volume I and $1.50 for Volume II.

Mobilization Designee Assignments Open In Army R&D

The Army Office of Research and Development is seeking applications to fill 86 mobilization designee assignment vacancies for grades ranging from major to colonel.

Active reserve officers will be considered on a selective basis in duty MOS 2167, Research and Development coordinator, and in MOS 2230, Psychologists.

The greatest demand is in the fields of nuclear physics, international affairs, life sciences, engineering, space physics, operations research, metallurgy, mathematics, chemistry, psychology, environmental sciences, budgeting and plans and programming. Credit is given for both military and civilian experience.

Mobilization designees have their training carefully monitored by the Office of the Chief of Research and Development (OCRD) to insure continuing career development. Duty may be within OCRD in the Pentagon, with R&D laboratories or by attendance or participation in Army R&D seminars. Arrangements for special R&D projects to earn retirement points may be made by those accepted officers who have scheduling difficulties.

Applications should be made on Department of the Army Form 2976 (Army Regulations 140–10 and 140–145) addressed to: Commanding Officer, U.S. Army Reserve Components Personnel Center, Fort Benjamin Harrison, Ind., through the appropriate U.S. Army Corps commander.

For those desiring assignment to the Office of the Chief of Research and Development, further information may be obtained by writing to the Office, Chief of Research and Development, Department of the Army, ATTN: Military Personnel Branch, Washington, D.C. 20310.

DEFENSE PRIME CONTRACT AWARDS TO SMALL BUSINESS

(Amounts in Thousands)

	July-Nov. 1965	July-Nov. 1964
Procurement from All Firms	12,454,661	9,997,552
Procurement from Small Business Firms	2,622,872	2,063,883
Percent Small Business	21.1	20.7

Architects and Engineers Are Key to OCD Shelter Development Program

Architects and engineers exert the greatest single influence in the success of the Office of Civil Defense (OCD) Fallout Shelter Development Program. All buildings have shielded areas affording some degree of protection. This basic protection can be improved in future building construction without appreciably increasing the cost or adversely affecting the esthetics and function for normal use. Special knowledge is required to increase the lifesaving potential in new buildings—knowledge of the nature of radioactive fallout and how to design structure to provide shielding against it.

Because of its vital lifesaving potential, the development of a nationwide fallout shelter system is the core of civil defense planning. The aim is to achieve fallout shielding for all Americans through a network of dual-use public shelter space and by encouragement of private shelter development.

The vigorous construction program of the past few years and the continued expansion of this program throughout the United States offers an opportunity for a significant increase in America's fallout shelter inventory. The OCD Professional Development Program is designed to encourage such planning.

Architectural and engineering colleges and universities are playing an expanded role in disseminating the new technology of radiation shielding analysis and other related subjects to the design professions. Through this means, practicing professionals, as well as new graduates, can keep abreast of current developments.

With the cooperation of architectural and engineering educational institutions and their faculty members, a unique professional development program for practicing architects and engineers was initiated in 1961.

Fallout Shelter Analysis Courses are offered as intensive two-week sessions, on a semester type basis (one night a week for 15 weeks) or as a correspondence course. The courses acquaint architects and engineers with nuclear weapon effects and shielding methodology and design techniques. Architects and engineers who successfully complete the course are certified as Fallout Shelter Analysts and are periodically apprised of the latest developments including research reports.

Protective Construction Courses on a two-week or semester type basis are also offered. These courses are primarily concerned with structural dynamics and response of structures to the immediate effects of a nuclear detonation.

In addition, Environmental Engineering Courses are offered to acquaint the mechanical engineer with the unique problems associated with shelter environment control and the procedures for solving these problems. Other courses such as Disaster Engineering and Shelter Planning are now being developed for future presentation.

The immediate objective of this professional development program is to survey and locate potential public fallout shelter space in existing structures—a type of post-design analysis. But the program also provides the orientation that architects and engineers must have if fallout protection is to be considered at the critical point in the creation of a building—the design stage.

"Canine Corps" Seeks Recruits for Vietnam

Air Force sentry dog teams have performed so effectively in protecting American lives and preventing sabotage in South Vietnam that the quota has been doubled for canine recruits.

The 1,000-dog quota set in September has been raised to 2,000 to meet the increasing demand for sentry dog teams.

To qualify for duty in Vietnam, the dogs must be German shepherds only, male or spayed female, 12-36 months old, at least 23 inches high at the shoulder and weigh at least 60 pounds.

Anyone wishing to donate or sell German shepherd dogs is urged to write the USAF Animal Procurement Office, Lackland AFB, Tex. 78236.

Medical Research Labs Combine at WPAFB

The Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio, have merged their biophysics and biomedical laboratories. The new unit is called the Biophysics Laboratory.

The organizational switch was prompted, in part, by increasing emphasis on toxic hazards research and the resulting additions of tasks and employees. Toxicology work has been elevated to division status.

Realignment of the Aerospace Medical Research Laboratories reduces the number of laboratory units to two—the Biophysics Laboratory and the Behavior Science Laboratory, which remains unchanged.

During the past two years, space nutrition research has been diminishing at the Laboratories but the effort is being continued by the Aerospace Medical Division's School of Aerospace Medicine, Brooks AFB, Tex.

Other changes include establishment of a Life Support Division to bring together all related engineering and biological research.

No reduction in force was necessary in the change, and the Laboratories strength remains at 356 (227 civilians and 129 military personnel).

NORAD Excess ADP Equipment To Be Redistributed

An estimated $65 million worth of automatic data processing equipment left over after the reorganization of the North American Air Defense Command is slated for redistribution by the Department of Defense at no cost other than crating and shipping.

The excess equipment resulted from the phase out of certain semi-automatic ground environment (SAGE) facilities and will be made available to other DOD and Federal agencies.

Authorized donees will also be included in the redistribution of the equipment. Eligibility of authorized donees is determined by State agencies for surplus property and is contingent on support of education, public health or civil defense programs.

On-site operational inspections of the equipment will be held at Truax AFB, Wis., March 1, 2 and 3 and at Norton AFB, Calif., March 8, 9 and 10.

A catalog describing the equipment can be obtained from the Defense Supply Agency, Attention: DSAH–LSR, Cameron Station, Alexandria, Va. 22314.

FINANCIAL SUMMARY

(BILLIONS OF DOLLARS)

	FY 1961	FY 1962		FY 1963	FY 1964	FY 1965	FY 1966			FY 1967
		Original	Final				Enacted & Auth. [a]	SEA Suppl.	Total	
Strategic Offensive Forces	---	7.6	8.9	8.3	7.3	5.3	4.6	.5	5.1	5.1
Continental Air and Missile Defense Forces.	---	2.2	2.3	1.9	2.0	1.6	1.7	---	1.7	1.4
General Purpose Forces	---	14.5	17.5	17.5	17.7	19.0	21.2	8.8	30.0	25.7
Airlift/Sealift Forces	---	.9	1.2	1.3	1.2	1.5	1.7	.5	2.2	2.1
Reserve and Guard Forces	---	1.7	1.8	1.8	1.9	2.1	2.1	.1	2.2	2.4
Research and Development	---	3.9	4.2	5.1	5.4	4.9	5.2	.1	5.3	5.5
General Support	---	11.4	12.1	12.9	13.8	14.5	15.0	1.8	16.8	16.7
Retired Pay	---	.9	.9	1.0	1.2	1.4	1.6	---	1.6	1.8
Military Assistance	---	1.8	1.8	1.6	1.2	1.3	1.6	---	1.6	1.0
Total Obligational Authority	46.1	44.9	50.7	51.5	51.7	51.4	54.6	11.9	66.5	61.4
Less: Financing Adjustments	−3.0	−1.3	−1.3	−.4	−.8	−.9	−3.6	+.4	−3.2	−1.5
New Obligational Authority	43.1	43.7	49.4	51.1	50.9	50.5	51.0	12.3	63.3	59.9
Adjustment to Expenditures	+1.6	+1.0	−1.2	−1.1	+.3	−3.1	−.7	−8.4	−9.1	−1.6
Total Expenditures	44.7	44.7	48.2	50.0	51.2	47.4	50.3	3.9	54.2	58.3
TOA by Department and Agency										
Department of the Army	10.4	10.4	12.5	11.9	12.5	12.2	13.2	4.8	18.0	17.4
Department of the Navy	12.7	12.4	14.7	14.8	14.7	15.0	16.3	3.2	19.4	17.6
Department of the Air Force	19.9	18.5	19.7	20.5	20.2	19.6	19.7	3.7	23.4	21.5
Civil Defense	---	---	.3	.1	.1	.1	.1	---	.1	.1
Defense Agencies	.3	.4	.3	1.0	1.1	1.1	1.3	.2	1.6	1.5
Retired Pay	.8	.9	.9	1.0	1.2	1.4	1.6	---	1.6	[b]1.8
Defense Family Housing [c]	.5	.5	.5	.6	.7	.6	.7	---	.7	.5
Military Assistance	1.5	1.8	1.8	1.6	1.2	1.3	1.6	---	1.6	1.0
Total—TOA [d]	46.1	44.9	50.7	51.5	51.7	51.4	54.6	11.9	66.5	61.4
MEMO: Increases since FY 1961 in in rates of compensation included above:										
Increased Compensation Rate:										
Military	---	---	---	.1	1.1	1.6	2.4	---	2.4	2.5
Civilian	---	---	---	.2	.3	.6	.7	---	.7	.8
Increased Payments to Retired Personnel.	---	.1	.1	.2	.4	.6	.8	---	.8	1.0
Total	---	.1	.1	.5	1.8	2.8	3.9	---	3.9	4.3
Unfunded military retirement past service liability.	45.1	---	47.3	48.9	56.1	58.3	66.5	---	66.5	69.2

[a] Included is authority granted by August 1965 Amendment (i.e., $1.7 billion for Southeast Asia) plus $.9 billion for increased personnel compensation.

[b] At current pay rates, it would require $2.1 billion in FY 1967 to fund "current service costs."

[c] In 1961 and 1962 funds for this activity were appropriated to the military departments.

[d] Excludes cost of nuclear warheads.

Department of Defense

Direct Budget Plan (TOA), New Obligational Authority, Direct Obligations and Expenditures
Fiscal Years 1965 - 1967

(MILLIONS OF DOLLARS)

	Direct Budget Plan (TOA)			New Obligational Authority			Direct Obligations			Expenditures		
	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967
Functional Classification												
Military Personnel												
Active Forces	12,698	14,552	16,016	12,506	14,522	16,016	12,698	14,552	16,016	12,662	14,250	15,560
Reserve Forces	732	860	880	751	860	880	732	860	880	725	770	840
Retired Pay	1,386	1,600	1,780	1,399	1,600	1,780	1,386	1,600	1,780	1,384	1,580	1,750
Total	14,816	17,011	18,676	[a]14,656	[a]16,981	18,676	14,816	17,011	18,676	14,771	16,600	18,150
Operation and Maintenance	12,563	14,911	15,700	12,603	14,911	15,700	12,563	14,911	15,700	12,349	14,160	14,980
Procurement	14,423	22,676	17,834	13,836	19,881	16,408	13,483	20,603	18,474	11,839	13,880	15,970
Research, Development, Test, and Evaluation	6,527	6,946	6,914	6,483	6,791	6,905	6,387	7,011	6,893	6,236	6,370	6,400
Military Construction	988	2,528	612	1,049	2,500	593	1,051	1,924	1,327	1,007	1,140	1,120
Family Housing	650	694	527	631	666	522	662	624	684	619	650	545
Civil Defense	102	107	134	105	107	133	95	118	145	93	100	100
Revolving and Management Funds	------	------	------	------	------	------	------	------	------	−741	25	−115
Total, Military Functions	50,069	64,874	60,397	49,363	61,838	58,938	49,057	62,203	61,900	46,173	52,925	57,150
Military Assistance	1,326	1,591	1,027	1,130	1,470	917	1,167	1,478	917	1,229	1,275	1,150
Total, Mil. Functions and Mil. Assistance	51,394	66,465	61,424	50,493	63,308	59,855	50,224	63,681	62,817	47,401	54,200	58,300
Department or Agency												
Department of the Army	12,234	18,034	17,376	12,003	17,075	17,116	12,172	17,453	17,713	11,600	14,024	16,518
Department of the Navy	14,982	19,428	17,579	14,845	18,383	16,952	14,622	18,768	17,765	13,399	15,461	17,055
Department of the Air Force	19,607	23,449	21,498	19,219	22,477	20,942	19,007	22,146	22,204	18,216	19,766	19,809
Defense Agencies/OSD	3,145	3,856	3,809	3,192	3,796	3,794	3,161	3,719	4,072	2,865	3,574	3,668
Civil Defense	102	107	134	105	107	133	95	118	145	93	100	100
Total, Military Functions	50,069	64,874	60,397	49,363	61,838	58,938	49,057	62,203	61,900	46,173	52,925	57,150
Military Assistance	1,326	1,591	1,027	1,130	1,470	917	1,167	1,481	917	1,229	1,275	1,150
Total, Mil. Functions and Mil. Assistance	51,394	66,465	61,424	50,493	63,308	59,855	50,224	63,684	62,817	47,401	54,200	58,300

NOTE: FY 1966 NOA includes amounts proposed for separate transmittal: $12,345,710,000 for Vietnamese Special Support; $761,100,000 for military pay increase; and $102,421,000 for civilain pay increase.

[a] In addition, transfers from working capital funds: FY 1965, $193,300,000; FY 1966, $30,000,000.

OASD (Comptroller)
FAD-524
January 24, 1966

Department of Defense

Direct Budget Plan (TOA), New Obligational Authority, Direct Obligations and Expenditures Fiscal Year 1967—By Functional Title and Service

(MILLIONS OF DOLLARS)

Functional Classification	Direct Budget plan (TOA)					New Obligational Authority					Direct Obligations					Expenditures				
	Total	Army	Navy	Air Force	Defense Agencies and Civil Defense	Total	Army	Navy	Air Force	Defense Agencies and Civil Defense	Total	Army	Navy	Air Force	Defense Agencies and Civil Defense	Total	Army	Navy	Air Force	Defense Agencies and Civil Defense
MILITARY PERSONNEL																				
Active Forces	16,016	6,164	4,835	5,016	------	16,016	6,164	4,835	5,016	------	16,016	6,164	4,835	5,016	------	15,560	5,950	4,680	4,930	------
Reserve Forces	880	581	148	150	------	880	581	148	150	------	880	581	148	150	------	840	564	140	136	------
Retired Pay	1,780	------	------	------	1,780	1,780	------	------	------	1,780	1,780	------	------	------	1,780	1,750	------	------	------	1,750
Total	18,676	6,746	4,984	5,166	1,780	18,676	6,746	4,984	5,166	1,780	18,676	6,746	4,984	5,166	1,780	18,150	6,514	4,820	5,066	1,750
OPERATION AND MAINTENANCE	15,700	5,350	4,308	5,193	849	15,700	5,350	4,308	5,193	849	15,700	5,350	4,308	5,193	849	14,980	5,040	4,141	5,014	785
PROCUREMENT																				
Aircraft	6,560	592	1,612	4,355	------	5,976	592	1,422	3,961	------	7,274	685	1,893	4,696	------	6,717	854	2,163	3,700	------
Missiles	1,981	356	385	1,240	------	1,931	356	385	1,190	------	1,939	334	395	1,211	------	1,751	224	472	1,055	------
Ships	2,041	------	2,041	------	------	1,751	------	1,751	------	------	1,907	------	1,907	------	------	1,700	------	1,700	------	------
Tracked Combat Vehicles	363	359	4	------	------	363	359	4	------	------	355	351	4	------	------	287	277	10	------	------
Ordnance, Vehicles, and Related Equipment	4,564	1,648	1,370	1,545	1	4,218	1,448	1,301	1,469	1	4,606	1,650	1,340	1,614	1	3,403	1,162	1,231	1,009	1
Electronics and Communications	963	293	417	225	28	879	268	369	214	28	1,034	301	432	273	27	1,048	360	353	313	21
Other Procurement	1,363	312	564	463	24	1,289	288	540	439	22	1,358	295	540	500	23	1,064	343	396	308	18
Total	17,834	3,561	6,392	7,827	54	16,408	3,311	5,772	7,273	51	18,474	3,616	6,511	8,295	52	15,970	3,220	6,325	6,385	40
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION																				
Military Sciences	625	162	192	164	107	625	162	192	164	107	616	159	185	163	109	592	152	185	152	104
Aircraft	1,028	93	246	678	12	1,028	93	246	678	12	1,037	90	238	697	12	1,034	86	245	691	11
Missiles	2,334	719	665	830	119	2,334	719	665	830	119	2,315	721	643	831	120	2,063	674	488	788	113
Astronautics	843	13	13	814	4	843	13	13	814	4	853	13	12	824	4	835	13	16	803	3
Ships	282	1	281	------	------	282	1	281	------	------	271	1	270	------	------	309	------	309	------	------
Ordnance, Vehicles, and Related Equipment	367	187	178	------	2	367	187	178	------	2	360	187	172	------	2	347	175	171	------	1
Other Equipment	857	267	87	289	214	848	267	87	289	205	865	272	84	292	218	829	261	76	284	207
Programwide Management and Support	453	78	86	278	11	453	78	86	278	11	451	78	86	277	11	381	74	75	222	10
Emergency Fund	125	------	------	------	125	125	------	------	------	125	125	------	------	------	125	10	------	------	------	10
Total	6,914	1,519	1,749	3,054	593	6,905	1,519	1,749	3,054	584	6,893	1,520	1,690	3,084	600	6,400	1,435	1,565	2,940	460
MILITARY CONSTRUCTION																				
Active Forces	583	191	141	244	8	575	191	134	243	8	1,284	468	264	445	108	1,090	380	250	385	75
Reserve Forces	28	10	5	13	------	18	------	5	13	------	43	14	8	21	------	30	9	6	15	------
Total	612	201	146	257	8	593	191	139	256	8	1,327	482	272	466	108	1,120	389	256	400	75
FAMILY HOUSING	527	------	------	------	527	522	------	------	------	522	684	------	------	------	684	545	------	------	------	545
CIVIL DEFENSE	134	------	------	------	134	133	------	------	------	133	145	------	------	------	145	100	------	------	------	100
REVOLVING AND MANAGEMENT FNUDS		------	------	------	------	------	------	------	------	------	------	------	------	------	------	—115	—80	—52	5	12
TOTAL—MILITARY FUNCTIONS	60,397	17,376	17,579	21,498	3,944	58,938	17,116	16,952	20,942	3,927	61,900	17,713	17,765	22,204	4,217	57,150	16,518	17,055	19,809	3,768
MILITARY ASSISTANCE	1,027					917					917					1,150				
TOTAL—MIL. FUNCTIONS & MIL. ASSISTANCE	61,424					59,855					62,817					58,300				

OASD (Comptroller)
FAD-525
January 24, 1966

Department of Defense—Military Functions
Procurement FY 1965 - 1967
(MILLIONS OF DOLLARS)

Functional Classification	Direct Budget Plan (TOA)			New Obligational Authority			Direct Obligations			Expenditures		
	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967
AIRCRAFT												
Army	395	1,333	592	451	1,311	592	406	1,237	685	346	299	854
Navy	2,063	3,224	1,612	1,888	2,791	1,422	1,931	2,835	1,893	1,739	1,801	2,163
Air Force	3,971	5,596	4,355	3,623	5,261	3,961	3,554	4,721	4,696	3,115	3,900	3,700
Total	6,429	10,153	6,560	5,962	9,363	5,976	5,891	8,793	7,274	5,200	6,000	6,717
MISSILES												
Army	243	369	356	234	341	356	209	329	334	254	118	224
Navy	565	424	385	666	427	385	514	417	395	521	544	472
Air Force	1,614	1,243	1,240	1,715	840	1,190	1,352	1,200	1,211	1,320	1,210	1,055
Total	2,422	2,036	1,981	2,615	1,608	1,931	2,075	1,946	1,939	2,096	1,872	1,751
SHIPS—Navy	1,815	1,930	2,041	1,905	1,590	1,751	1,905	1,770	1,907	1,713	1,650	1,700
TRACKED COMBAT VEHICLES												
Army	203	376	359	203	292	359	201	372	351	198	179	277
Navy	8	13	4	8	13	4	3	14	4	38	10	10
Total	211	389	363	211	306	363	204	386	355	236	189	287
ORDNANCE, VEHICLES, AND RELATED EQUIPMENT												
Army	718	2,031	1,648	563	1,564	1,448	727	1,892	1,650	470	1,126	1,162
Navy	571	1,628	1,370	533	1,500	1,301	501	1,584	1,340	369	640	1,231
Air Force	404	1,445	1,545	335	1,370	1,469	403	1,298	1,614	233	348	1,009
Defense Agencies/OSD	1	2	1	1	2	1	1	2	1	1	2	1
Total	1,693	5,105	4,564	1,431	4,436	4,218	1,632	4,776	4,606	1,073	2,117	3,403
ELECTRONICS AND COMMUNICATIONS												
Army	206	450	293	178	334	268	300	447	301	277	312	360
Navy	399	470	417	427	406	369	349	495	432	280	294	353
Air Force	438	447	225	419	424	214	415	399	273	329	387	313
Defense Agencies/OSD	13	10	28	16	4	28	8	11	27	11	9	21
Total	1,055	1,377	963	1,039	1,167	879	1,072	1,351	1,034	897	1,001	1,048
OTHER PROCUREMENT												
Army	210	487	312	154	332	288	160	451	295	219	236	343
Navy	416	738	564	351	657	540	386	726	540	273	381	396
Air Force	141	434	463	121	412	439	141	375	500	103	410	308
Defense Agencies/OSD	29	26	24	46	9	22	18	29	23	31	24	18
Total	797	1,685	1,363	672	1,411	1,289	704	1,581	1,358	625	1,051	1,064
TOTAL—PROCUREMENT												
Army	1,974	5,045	3,561	1,783	4,174	3,311	2,002	4,728	3,616	1,764	2,270	3,220
Navy	5,837	8,428	6,392	5,778	7,385	5,772	5,589	7,841	6,511	4,933	5,320	6,325
Air Force	6,568	9,165	7,827	6,213	8,307	7,273	5,865	7,992	8,295	5,101	6,255	6,385
Defense Agencies/OSD	43	37	54	62	15	51	27	42	52	42	35	40
TOTAL	14,423	22,676	17,834	13,836	19,881	16,408	13,483	20,603	18,474	11,839	13,880	15,970

OASD (Comptroller)
January 24, 1966
FAD-526

Department of Defense—Military Functions

Research, Development, Test, and Evaluation FY 1965 - 1967

(MILLIONS OF DOLLARS)

Functional Classification	Direct Budget Plan (TOA)			New Obligational Authority			Direct Obligations			Expenditures		
	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967	FY 1965	FY 1966	FY 1967
MILITARY SCIENCES												
Army	168	160	162	160	156	162	173	160	159	167	147	152
Navy	183	186	192	178	181	192	188	186	185	176	183	185
Air Force	161	159	164	130	158	164	159	152	163	144	143	152
Defense Agencies/OSD	108	103	107	108	103	107	100	109	109	86	98	104
Total	621	608	625	577	598	625	620	607	616	573	572	592
AIRCRAFT												
Army	75	105	93	70	100	93	69	100	90	69	90	86
Navy	251	286	246	248	276	246	222	294	238	223	231	245
Air Force	803	796	678	738	720	678	801	815	697	722	758	691
Defense Agencies/OSD	7	17	12	7	7	12	3	17	12	3	16	11
Total	1,136	1,205	1,028	1,063	1,103	1,028	1,095	1,226	1,037	1,017	1,094	1,034
MISSILES												
Army	660	681	719	629	646	719	631	670	721	578	636	674
Navy	386	398	665	378	389	665	390	404	643	378	394	488
Air Force	801	799	830	797	788	830	802	764	831	831	712	788
Defense Agencies/OSD	130	120	119	131	120	119	132	126	120	114	114	113
Total	1,977	1,998	2,334	1,935	1,942	2,334	1,955	1,964	2,315	1,901	1,855	2,063
ASTRONAUTICS												
Army	15	23	13	15	2	13	21	22	13	21	22	13
Navy	28	21	13	34	24	13	24	22	12	24	24	16
Air Force	862	988	814	837	987	814	848	1,000	824	873	932	803
Defense Agencies/OSD	3	4	4	3	4	4	4	4	4	3	3	3
Total	908	1,036	843	889	1,017	843	897	1,048	853	921	981	835
SHIPS												
Army	1	2	1	1	2	1	1	1	1	------	1	------
Navy	285	330	281	280	348	281	256	338	270	249	281	309
Total	286	331	282	281	350	282	257	340	271	249	282	309
ORDNANCE, VEHICLES, AND RELATED EQUIPMENT												
Army	205	201	187	191	190	187	203	201	187	203	188	175
Navy	155	190	178	148	184	178	137	195	172	126	152	171
Defense Agencies/OSD	1	1	2	1	1	2	2	1	2	1	1	1
Total	361	393	367	341	376	367	342	397	360	330	340	347
OTHER EQUIPMENT												
Army	228	258	267	264	291	267	225	273	272	222	243	261
Navy	67	80	87	58	88	87	62	84	84	52	69	76
Air Force	248	312	289	282	303	289	214	336	292	193	315	284
Defense Agencies/OSD	242	243	214	244	246	205	274	253	218	237	228	207
Total	785	893	857	848	928	848	775	945	865	704	855	829
PROGRAMWIDE MANAGEMENT AND SUPPORT												
Army	72	74	78	72	75	78	71	75	78	85	73	74
Navy	68	78	86	63	76	86	61	78	86	65	68	75
Air Force	302	301	278	391	297	278	304	300	277	384	240	222
Defense Agencies/OSD	11	11	11	11	11	11	10	11	11	9	10	10
Total	454	464	453	536	458	453	447	465	451	542	391	381
EMERGENCY FUND												
Defense Agencies/OSD	------	19	125	12	19	125	------	19	125	------	------	10
TOTAL—RESEARCH, DEVELOPMENT, TEST, AND EVALUATION												
Army	1,425	1,504	1,519	1,402	1,462	1,519	1,393	1,502	1,520	1,344	1,400	1,435
Navy	1,423	1,569	1,749	1,388	1,566	1,749	1,341	1,602	1,690	1,294	1,400	1,565
Air Force	3,176	3,355	3,054	3,175	3,253	3,054	3,128	3,366	3,084	3,146	3,100	2,940
Defense Agencies/OSD	503	518	593	518	511	584	525	541	600	452	470	460
TOTAL	6,527	6,946	6,914	6,483	6,791	6,905	6,387	7,011	6,893	6,236	6,370	6,400

OASD(Comptroller)
FAD–527
January 24, 1966

Department of Defense

Estimated Obligations and Amounts Available for Obligation
General Fund Appropriations—FY 1965 - 1967

(IN THOUSANDS)

	Unobligated balance brought forward	New obligational authority	Transfers of prior year balances	Reimburse-ments	Total available for obligation	Obligations incurred	Unobligated balance expiring for obligation	Unobligated balance carried forward
FISCAL YEAR 1965—ACTUAL								
Department of the Army	2,362,398	12,003,016	48,800	1,991,989	16,406,202	13,999,359	18,895	2,387,949
Department of the Navy	4,662,535	14,844,723	63,500	1,208,113	20,778,871	15,629,654	21,963	5,127,254
Department of the Air Force	2,633,812	19,218,817	81,000	1,317,766	23,251,394	20,036,416	1,182	3,213,796
Defense Agencies/OSD	285,488	3,191,728	------	259,795	3,737,011	3,413,437	46,842	276,732
Civil Defense	16,426	105,185	------	510	122,121	94,983	3,682	23,456
Total—Military Functions	9,960,659	49,363,468	193,300	4,778,172	64,295,599	53,173,849	92,564	11,029,187
Military Assistance [a]	4,398	1,130,000	55,000	7,996	1,197,394	1,174,746	493	22,155
Total—Mil. Functions & Mil. Assist.	9,965,057	50,493,468	248,300	4,786,168	65,492,993	54,348,595	93,057	11,051,341
FISCAL YEAR 1966—ESTIMATED								
Department of the Army	2,387,949	17,075,339	30,000	3,095,540	22,588,829	20,551,430	------	2,037,399
Department of the Navy	5,127,254	18,383,484	------	1,239,226	24,749,964	19,746,241	------	5,003,724
Department of the Air Force	3,213,796	22,476,651	------	1,355,621	27,046,068	23,378,034	------	3,668,033
Defense Agencies/OSD	276,732	3,795,935	------	60,543	4,133,210	3,772,636	------	360,573
Civil Defense	23,456	106,766	------	195	130,417	118,667	------	11,750
Total—Military Functions	11,029,187	61,838,174	30,000	5,751,125	78,648,488	67,567,009	------	11,081,479
Military Assistance [a]	22,155	1,470,000	—873	------	1,491,282	1,481,282	------	10,000
Total—Mil. Functions & Mil. Assist.	11,051,341	63,308,174	29,127	5,751,125	80,139,770	69,048,291	------	11,091,479
FISCAL YEAR 1967—ESTIMATED								
Department of the Army	2,037,399	17,116,394	------	2,870,631	22,024,424	20,403,739	------	1,620,685
Department of the Navy	5,003,724	16,952,200	------	1,074,559	23,030,483	18,879,429	------	4,151,054
Department of the Air Force	3,668,033	20,942,200	------	1,237,419	25,847,652	23,304,349	------	2,543,303
Defense Agencies/OSD	360,573	3,793,506	------	66,053	4,220,132	4,126,190	------	93,942
Civil Defense	11,750	133,400	1,000	195	146,345	145,675	------	670
Total—Military Functions	11,081,479	58,937,700	1,000	5,248,857	75,269,036	66,859,382	------	8,409,654
Military Assistance [a]	10,000	917,000	------	------	927,000	917,000	------	10,000
Total—Mil. Functions & Mil. Assist.	11,091,479	59,854,700	1,000	5,248,857	76,196,036	67,776,382	------	8,419,654

[a] Consistent with the Budget Document presentation, Military Assistance orders (reservations) placed with the military departments are treated in the same manner as obligations.

OASD(Comptroller)
FAD-528
January 24, 1966

Department of Defense

Estimated Expenditures and Amounts Available for Expenditure
Fiscal Years 1965 - 1967

(IN THOUSANDS)

	Unexpended balance brought forward	New obligational authority	Transfers of prior year balances	Total available for expenditure	Expenditures	Balances withdrawn (-) or restored	Unexpended balance carried forward
FISCAL YEAR 1965—ACTUAL							
Department of the Army	5,866,008	12,003,016	13,800	17,882,824	11,600,358	—87,661	6,194,805
Department of the Navy	14,143,303	14,844,723	63,500	29,051,526	13,398,874	—37,592	15,615,060
Department of the Air Force	8,688,182	19,218,817	40,000	27,946,998	18,216,010	—18,786	9,712,203
Defense Agencies/OSD	1,209,640	3,191,728	—117,300	4,284,068	2,864,909	—55,147	1,364,012
Civil Defense	113,903	105,185	------	219,088	92,718	—22,185	104,185
Total—Military Functions	30,021,036	49,363,468	------	79,384,504	46,172,869	—221,371	32,990,264
Military Assistance	1,993,509	1,130,000	55,000	3,178,509	1,228,579	—493	1,949,437
Total—Mil. Functions & Mil. Assist.	32,014,545	50,493,468	55,000	82,563,013	47,401,449	—221,864	34,939,700
FISCAL YEAR 1966—ESTIMATED							
Department of the Army	6,194,805	17,075,339	------	23,270,144	14,024,438	12,300	9,258,006
Department of the Navy	15,615,060	18,383,484	------	33,998,544	15,461,350	8,600	18,545,794
Department of the Air Force	9,712,203	22,476,651	------	32,188,853	19,765,532	45,800	12,469,121
Defense Agencies/OSD	1,364,012	3,795,935	------	5,159,947	3,573,680	------	1,586,267
Civil Defense	104,185	106,766	------	210,951	100,000	------	110,951
Total—Military Functions	32,990,264	61,838,174	------	94,828,438	52,925,000	66,700	41,970,138
Military Assistance	1,949,437	1,470,000	------	3,419,437	1,275,000	------	2,144,437
Total—Mil. Functions & Mil. Assist.	34,939,700	63,308,174	------	98,247,874	54,200,000	66,700	44,114,574
FISCAL YEAR 1967—ESTIMATED							
Department of the Army	9,258,006	17,116,394	------	26,374,400	16,518,415	------	9,855,985
Department of the Navy	18,545,794	16,952,200	------	35,497,994	17,054,615	------	18,443,379
Department of the Air Force	12,469,121	20,942,200	------	33,411,321	19,809,025	------	13,602,296
Defense Agencies/OSD	1,586,267	3,793,506	------	5,379,773	3,667,945	------	1,711,828
Civil Defense	110,951	133,400	------	244,351	100,000	------	144,351
Total—Military Functions	41,970,138	58,937,700	------	100,907,838	57,150,000	------	43,757,838
Military Assistance	2,144,437	917,000	------	3,061,437	1,150,000	------	1,911,437
Total—Mil. Functions & Mil. Assist.	44,144,574	59,854,700	------	103,969,274	58,300,000	------	45,669,274

OASD (Comptroller)
FAD-529
January 24, 1966

Department of Defense

Order of Magnitude Data on Comparative Expenditures By Functional Title As If FY 1967 Budget Structure Had Been Adopted Circa 1948 FY 1954 - 1967

(MILLIONS OF DOLLARS)

	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967
Functional Classification														
Military Personnel														
Active Forces	10,963	10,643	10,665	10,384	10,441	10,545	10,390	10,651	11,530	11,386	12,312	12,662	14,250	15,560
Reserve Forces	293	341	439	514	608	615	654	648	607	599	674	725	770	840
Retired Pay	386	419	477	511	562	641	694	786	894	1,015	1,209	1,384	1,580	1,750
Total	11,643	11,403	11,582	11,409	11,611	11,801	11,738	12,085	13,032	13,000	14,195	14,771	16,600	18,150
Operation and Maintenance	9,162	7,931	8,400	9,487	9,761	10,378	10,223	10,611	11,594	11,874	11,932	12,349	14,160	14,980
Procurement														
Aircraft	9,080	8,804	7,835	8,647	8,793	7,730	6,272	5,898	6,400	6,309	6,053	5,200	6,000	6,717
Missiles	417	604	1,005	1,855	2,434	3,337	3,027	2,972	3,442	3,817	3,577	2,096	1,872	1,751
Ships	905	944	858	842	1,105	1,491	1,744	1,801	1,906	2,522	2,078	1,713	1,650	1,700
Tracked Combat Vehicles	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	236	189	287
Ordnance, Vehicles, and Related Equipment	3,334	1,191	1,260	674	365	399	443	675	1,137	1,665	1,597	1,073	2,117	3,403
Electronics and Communications	700	441	660	704	663	720	1,093	1,042	1,139	1,427	1,264	897	1,001	1,048
Other Procurement	1,521	854	608	767	723	730	755	706	507	891	782	625	1,051	1,064
Total	15,957	12,838	12,227	13,488	14,083	14,409	13,334	13,095	14,532	16,632	15,351	11,839	13,880	15,970
Research, Development, Test, and Evaluation	2,187	2,261	2,101	2,406	2,504	2,866	4,710	6,131	6,319	6,376	7,021	6,236	6,370	6,400
Military Construction	1,744	1,715	2,079	1,968	1,753	1,948	1,626	1,605	1,347	1,144	1,026	1,007	1,140	1,120
Family Housing	-----	-----	-----	-----	-----	-----	-----	-----	-----	427	580	619	650	545
Civil Defense	−3	*	*	−1	*	*	*	*	90	203	107	93	100	100
Revolving and Management Funds	−219	−611	−684	−323	−643	−179	−416	−300	−99	−1,401	−452	−741	25	−115
Adjustment to Budget Basis	−145	−6	86	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total—Military Functions	40,326	35,531	35,792	38,436	39,070	41,223	41,215	43,227	46,815	48,252	49,760	46,173	52,925	57,150
Military Assistance	3,629	2,292	2,611	2,352	2,187	2,340	1,609	1,449	1,390	1,721	1,485	1,229	1,275	1,150
Total—Military Functions & Military Assistance	43,955	37,823	38,403	40,788	41,258	43,563	42,824	44,676	48,205	49,973	51,245	47,401	54,200	58,300
Department or Agency														
Department of the Army	12,910	8,901	8,703	9,063	9,051	9,467	9,392	10,130	11,427	11,499	12,050	11,600	14,024	16,518
Department of the Navy	11,290	9,732	9,744	10,397	10,913	11,720	11,642	12,214	13,260	14,005	14,520	13,399	15,461	17,055
Department of the Air Force	15,666	16,405	16,750	18,261	18,437	19,083	19,065	19,785	20,840	20,642	20,509	18,216	19,766	19,809
Defense Agencies/OSD	464	494	596	615	669	953	1,115	1,098	1,198	1,905	2,574	2,865	3,574	3,668
Civil Defense	−3	*	*	−1	*	*	*	*	90	203	107	93	100	100
Total—Military Functions	40,326	35,531	35,792	38,436	39,070	41,223	41,215	43,227	46,815	48,252	49,760	46,173	52,925	57,150
Military Assistance	3,629	2,292	2,611	2,352	2,187	2,340	1,609	1,449	1,390	1,721	1,485	1,229	1,275	1,150
Total—Military Functions & Military Assistance	43,955	37,823	38,403	40,788	41,258	43,563	42,824	44,676	48,205	49,973	51,245	47,401	54,200	58,300

NOTE: Amounts include estimated comparability adjustments not supportable by accounting records.

* Less than $.5 million.

[a] Amount included in entry for "Ordnance, Vehicles, and Related Equipment."

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FAD-397
January 24, 1966

Department of Defense

Order of Magnitude Data on Comparative New Obligational Authority By Functional Title As If FY 1967 Budget Structure Had Been Adopted Circa 1948 FY 1954 - 1967

(MILLIONS OF DOLLARS)

	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967
Functional Classification														
Military Personnel														
Active Forces	11,266	10,650	10,526	10,411	10,398	10,709	10,637	10,695	11,545	11,431	12,273	12,699	14,552	16,016
Reserve Forces	315	369	512	613	607	644	674	660	633	672	703	751	860	880
Retired Pay	387	424	495	515	567	640	715	790	920	1,026	1,228	1,399	1,600	1,780
Total	11,968	11,442	11,534	11,539	11,572	11,993	12,026	12,144	13,098	13,129	14,204	14,849	17,011	18,676
Operation and Maintenance	9,462	8,276	8,768	9,734	10,221	10,187	10,317	10,702	11,759	11,496	11,705	12,603	14,911	15,700
Procurement														
Aircraft	5,041	4,922	6,923	6,559	5,945	6,167	5,929	4,998	5,646	5,882	5,640	5,962	9,363	5,976
Missiles	569	234	764	2,135	2,090	3,966	2,030	2,078	3,230	3,969	3,676	2,615	1,608	1,931
Ships	759	1,150	1,274	1,335	1,723	1,943	1,140	2,246	2,967	2,939	2,060	1,905	1,590	1,751
Tracked Combat Vehicles	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	211	306	363
Ordnance, Vehicles, and Related Equipment	2,990	527	405	247	90	545	703	1,034	1,830	1,959	2,028	1,431	4,436	4,218
Electronics and Communications	395	327	215	469	549	982	1,179	935	1,375	1,176	1,353	1,039	1,167	879
Other Procurement	835	260	214	549	586	701	720	425	697	742	889	672	1,411	1,289
Total	10,588	7,420	9,795	11,294	10,983	14,304	11,701	11,716	15,746	16,667	15,645	13,836	19,881	16,408
Research, Development, Test, and Evaluation	2,165	1,708	1,828	2,185	2,345	3,777	5,620	6,033	6,402	6,993	6,984	6,483	6,791	6,905
Military Construction	308	882	2,012	1,915	2,085	1,385	1,364	1,061	972	1,204	949	1,049	2,500	593
Family Housing	-----	-----	-----	-----	-----	-----	-----	-----	-----	590	644	631	666	522
Civil Defense	-----	-----	-----	-----	-----	-----	-----	-----	257	126	112	105	107	133
Revolving and Management Funds	100	1,119	-----	75	130	57	30	30	[b]	[b]	-----	-----	-----	-----
Subtotal—Military Functions—New Obligational Avail.	34,590	30,847	33,937	36,742	37,337	41,703	41,058	41,686	48,234	50,204	50,243	49,557	61,868	58,938
Transfers from prior year balances	-----	−60	−750	−487	−590	−535	−430	−366	−388	−410	−321	−193	−30	-----
Total—Military Functions—New Obligational Authority	34,590	30,787	33,187	36,255	36,747	41,168	40,628	41,321	47,846	49,794	49,922	49,363	61,838	58,938
Military Assistance	3,762	1,204	1,016	2,018	1,340	1,515	1,331	1,785	1,577	1,325	1,000	1,130	1,470	917
Total—Military Functions & Military Assistance	38,352	31,991	34,203	38,273	38,087	42,683	41,959	43,106	49,423	51,119	50,922	50,493	63,308	59,855
Department or Agency														
Department of the Army	12,777	7,764	7,354	7,672	7,731	9,381	9,689	9,914	12,141	11,631	12,513	12,003	17,075	17,116
Department of the Navy	9,612	10,221	9,648	10,220	10,506	11,820	11,270	12,431	14,757	15,286	14,899	14,845	18,383	16,952
Department of the Air Force	11,411	12,137	15,517	17,697	17,732	18,713	18,496	17,884	19,513	20,179	19,446	19,219	22,477	20,942
Defense Agencies/OSD	791	666	667	666	777	1,255	1,173	1,092	1,178	2,572	2,951	3,192	3,796	3,794
Civil Defense	-----	-----	-----	-----	-----	-----	-----	-----	257	126	112	105	107	133
Total—Military Functions	34,590	30,787	33,187	36,255	36,747	41,168	40,628	41,321	47,846	49,794	49,922	49,363	61,838	58,938
Military Assistance	3,762	1,204	1,016	2,018	1,340	1,515	1,331	1,785	1,577	1,325	1,000	1,130	1,470	917
Total—Military Functions & Military Assistance	38,352	31,991	34,203	38,273	38,087	42,683	41,959	43,106	49,423	51,119	50,922	50,493	63,308	59,855

NOTE: Amounts include estimated comparability adjustments not supportable by accounting records.

[a] Amount included in entry for "Ordnance Vehicles and Related Equipment."

[b] Excludes authority in Stock Funds (10 U.S.C. 2210(b)) to incur reimbursable obligations in anticipation of reimbursable orders to be received in subsequent years. Such authority is included in the Budget Document presentation as "New Obligational Authority."

OASD (Comptroller)
FAD-396
January 24, 1966

Department of Defense

Estimated Expenditures for Vietnamese Special Support
Fiscal Years 1966 and 1967

(MILLIONS OF DOLLARS)

	FY 1966	FY 1967
Military Personnel	1,140	2,494
Operation and Maintenance	1,898	2,854
Procurement	1,307	4,447
Research, Development, Test, and Evaluation	30	80
Military Construction	260	460
Total	4,635	10,335

NOTE: Amounts include expenditures from the $1.7 billion FY 1966 Amendment, and the $0.7 billion FY 1965 Supplemental.

New Labor Dept. Standards Used in DOD Labor Surplus Area Programs

New criteria for labor surplus areas conforming to those contained in the Public Works and Economic Development Act of 1965 (PL 89–136) have been incorporated in the Department of Labor "Area Trends in Employment and Unemployment" used by Defense Department procurement and small business/economic utilization specialists in making labor surplus area determinations.

Labor surplus area procurement actions are affected by the following changes:

• An effective date (Dec. 15) in the case of the October-November issue of the Department of Labor "Area Trends" is now set forth in the publication for use in procurement and will be in each subsequent issue giving three weeks lead-time for new listings.

• A shift from a monthly to an annual review of "persistent" labor surplus areas, i.e., those areas which have had a substantial unemployment rate of six percent or more, and which were either 50 percent above the national average for three of four preceding calendar years, or 75 percent for two of three preceding calendar years, or 100 percent above the national average for one of the two preceding calendar years.

• The classification of certain cities of 250,000 or more as "persistent" labor surplus areas, started in June 1964, will continue providing they meet certain Departments of Labor and Commerce criteria for such categories. Cities listed as "persistent" labor surplus areas are Oakland and San Diego, Calif.; Miami, Fla.; Newark, N.J.; and Philadelphia and Pittsburgh, Pa.

• Under the revised criteria all "persistent" and "substantial" areas are eligible for preferences in Federal procurement (in the form of partial set-asides in DOD). All persistent areas are eligible for benefits, including grants under all titles of the Public Works and Economic Development Act of 1965, and Small Business Administration Loan Assistance at the four percent rate. Substantial areas may also be eligible for such benefits, at least to include Public Works grants under Title I of the Act.

• All areas which were substantial or persistent on March 1, 1965, will continue to be eligible for Public Works Economic Development Act assistance until the first annual review of eligibility under the latter Act, which is presently scheduled for completion in June 1966.

Under the new criteria and standards, the number of areas of substantial or persistent unemployment as of November 1965 totals 527 (188 substantial and 339 persistent, plus five cities) broken down as follows:

• 20 major areas (10 substantial and 10 persistent plus five cities).

• 88 small areas (39 substantial and 49 persistent).

• 419 very small areas (139 substantial and 280 persistent).

Eight states have major labor surplus areas designated either persistent or substantial or both; California and Pennsylvania have six each, followed by Massachusetts with four, West Virginia with three, New Jersey and Puerto Rico with two each and Florida and Minnesota with one each.

Air Force Tests New Search and Rescue Device

The Air Force has completed a series of flight tests on a new device which, when installed in aircraft, may simplify present day search and rescue procedures.

Known as the C–141 Leigh Crash Position Indicator, the device consists of a beacon transmitter encased in a tumbling airfoil and tuned to the standard Air Force emergency frequency.

Flight tests consisted of nine test ejections of the crash position indicator made from a Lockheed C–141 Starlifter at the Air Force Systems Command's Air Force Missile Development Center, Holloman AFB, N.M.

The crash position indicator is located in an escape hatch behind the wing of the aircraft and is flush with the skin of the fuselage. Under emergency conditions a series of sensors indicate the emergency to the airfoil component causing a spring to lift its leading edge into the airstream after which the airfoil automatically ejects itself from the aircraft.

The airfoil, made of styrofoam, flutters to the ground like a huge falling leaf. From its position on the ground or water the indicator broadcasts its location to search parties seeking survivors from the crash.

Two additional missions are planned for early 1966 when a crash recorder will also be tested in conjunction with a small tape cassette inside the tumbling airfoil section on one C–141A aircraft. By including the radio transmission recorder in the crash package, the pilot's last transmissions from the aircraft are preserved for use in determining the cause of the mishap. Recorders in current military and civilian aircraft are often destroyed upon impact if the aircraft crashes.

(*Continued from Page 2*)

drug for fulciparum malaria and a wide variety of surveillance devices, weapons, munitions and personal equipment.

Military Construction.

As shown on Table 3, the bulk of the $1.2 billion requested for military construction is for facilities in Southeast Asia; the balance is for a variety of supporting facilities along the lines of communication back to the United States and, to a small extent, for training and troop facilities within the United States. The $1,238 million requested in this Supplemental, together with the $166 million provided by the August Amendment, will make a total of $1,404 million available for construction in support of Southeast Asia in FY 1966, $355 million more than the entire appropriation for military construction in FY 1965.

The explanation for this large request lies in the nature of the military operation we have undertaken in Southeast Asia. South Vietnam itself is primarily an agricultural country; the only major port is Saigon. The deployment of large U.S. military forces, and other friendly forces such as the Korean division, in a country of this sort requires the construction of new ports, warehouse facilities, access roads, improvements to highways leading to the interior of the country and along the coasts, troop facilities, hospitals, completely new airfields and major improvements to existing airfields, communications facilities, etc. We will be prepared to house and support additional units if their deployment should be required in the future. Since construction is a long lead time activity, the great bulk of this requirement has to be financed in the FY 1966 Supplemental. In order to provide some flexibility in the utilization of these funds, we are requesting that $200 million of the $1,238 million total program be appropriated to "Military Construction, Defense Agencies" for later transfer to the Military Departments as required.

Although I cannot assure you that the funds requested in this Supplemental will complete our construction program in Southeast Asia, since we do not know how the conflict there may evolve, I can tell you that the amount included in the FY 1967 Budget for military construction is very much smaller.

Financial Requirements.

Table 4 summarizes our financial requirements for the current fiscal year. The first column shows the amounts thus far enacted, less the $1.7 billion Amendment which is shown in the second column. The third column shows the net additional amounts required in FY 1966 to defray the costs of the pay raises enacted last year. The fourth column is the Supplemental for Southeast Asia which I have discussed, and the fifth column shows the total, $63,308,175,000 in new obligational authority, which would be available for the current fiscal year if the military and civilian pay supplemental and the Southeast Asia Supplemental are enacted as requested. . . .

Additional Authorizations.

The additional amounts requested to be authorized for aircraft, missiles, naval vessels and tracked combat vehicles and RDT&E, are shown in Tables 5 through 7. The additional military construction authorizations are identical to the amounts requested for appropriation, as shown on Table 3.

The President, in his State of the Union Address to the Congress on January 13, discussed the reasons for our greater military involvement in Southeast Asia and the resulting increases in Defense expenditures. I have attempted in this statement to outline the purposes for which the additional funds requested in this Supplemental are required. I can assure you that my associates in the Defense Department and I have reviewed this Supplemental with great care, and we now stand ready to help you in every way we can to facilitate the passage of the necessary legislation.

Table 1

Summary of Force and Personnel Increases Related to Southeast Asia

	Approved Aug. 65	Revised Jan. 66
1. Increase in Army Forces		
a. Division and Initial Support Forces		
b. 3 Brigades and Initial Support Forces		
c. Aviation Companies		
d. Sustaining Support for 1 Division, 3 Brigades and other forces		
e. STRAF support forces		
f. Expand training base and pipeline		
Total Army	235,000	306,657
2. Increase in Marine Forces		
a. 1 Division		
b. Activate forces to be deployed to Vietnam		
c. Bring units to be deployed to full strength		
d. Expand training and support base		
e. Provide increased pipeline		
Total Marine Corps	30,000	85,169
3. Increase in Naval Forces		
a. Retain ships		
b. Activate or procure ships		
c. Increase manning for deployed ships and bases in Southeast Asia		
d. Augment coastal and river patrol		
e. Augment construction forces		
f. Support of Marine Forces		
g. Flight training		
Total Navy	35,000	55,450

Table 1—Continued

Summary of Force and Personnel Increases Related to Southeast Asia

4. Increase in Air Forces		
a. B–52 aircraft deployed to Guam		
b. Tac. Ftr. and Troop Carrier Squadrons deployed to SEA and their CONUS rotation base		
c. Raise airlift aircraft utilization rates		
d. Expand training		
e. Other support (including logistical base)		
Total Air Force	40,000	63,245
Total Active Force Military	340,000	510,521
Adj. for substitution of civilians	------	−74,300
Other adjustments	------	+16,622
Net Increase	340,000	452,843
5. Increased Readiness for Reserve Components		
Army:		
a. To raise 3 Division and 6 Brigade Forces to 100% manning		18,500[b]
b. To man other ANG units at their authorized strengths	------	20,000
Total Army	------	38,500[c]
Marine Corps:		
c. Reserve Division/Wing Team	2,500	2,500
Air Force:		
d. 9 F–100 Squadrons	1,667	1,667
e. 4 RF–84 Squadrons	697	697
f. 1 Tac. Control Group	------	436
g. 11 C–124 Squadrons	2,205	2,205
Total Air Force	4,569	5,005
6. Increase in Direct Hire Civilian Personnel		
a. Army	11,600	31,133
b. Navy (Including Marine Corps)	15,500	21,400
c. Air Force	7,300	18,355
d. Defense Agencies	1,362	4,893
Total Personnel	35,762	75,781
Adjustment for substitution of civilians	------	+58,000
Other adjustments	------	−4,554
Net Increase	35,762	129,227

[a] Was to be determined.

[b] The remaining 11,500 personnel required to raise tbe manning of the Selected Reserve Force to 100 percent is being provided by redistribution from units for which there is no requirement in tb contingency plans.

[c] Represents increase over the end FY 1966 Army National Guard drill pay strengtb of 380,000 provided for in tbe FY 1966 Appropriation Act.

Table 2

Recapitulation of Military and Civilian Personnel Authorizations

	Budgeted Strengtb as of 6/30/66 Per Original Budget (1)	Increases Proposed as of Aug. 65 and Jan. 66 (2)	Adj. for Substitution of Civilians (3)	Other Adjustment (4)	Net Increase Proposed (5)	Strength Increase to be Realized By 6/30/66 (6)	Strength Increase to be Realized After 6/30/66 (7)
Active Duty							
Military Personnel							
Army	953,094	306,657	−36,500	+10,432	280,599	205,949	74,650
Navy	684,848	55,450	−15,000	+ 2,575	43,025	38,875	4,150
Marine Corps	193,190	85,169	− 2,800	+ 2,625	84,994	56,889	28,105
Air Force	809,134	63,245	−20,000	+ 980	44,225	45,364	−1,139*
Total	2,640,266	510,521	−74,300	+16,622	452,843	347,077	105,766
Direct Hire							
Civilian Personnel							
Army	317,152	31,133	+26,585	−16,947	40,771	42,480	−1,709*
Navy (Incl. USMC)	320,125	21,400	+14,415	+ 6,953	42,768	37,476	5,292
Air Force	286,099	18,355	+17,000	−12,737	22,618	15,279	7,339
Defense Agencies	40,778	4,893	------	+18,177	23,070	27,727	−4,657*
Total	964,154	75,781	+58,000[a]	− 4,554	129,227	122,962	6,265

* Denotes a small decrease in strength after end FY 1966.

[a] Excludes 2,500 additional Indirect Hire Civilians, bringing tbe total to 60,500.

Table 3

FY 1966 Supplemental for Procurement, RDT&E and Military Construction Related to Southeast Asia

(NEW OBLIGATIONAL AUTHORITY IN MILLIONS OF DOLLARS)

	Army	Navy	Marine Corps	Air Force	Defense Agencies	Total
Procurement						
Ammunition Consumption	671	366	338	758		2133
Aircraft						
Attrition	400	562	*	837		1799
Equip. of New Units	168		*			168
Spares	221	149	*	555		925
Other A/C Equipment	37	27	*	194		258
Total Aircraft	826	738	*	1586		3150
Vehicles	329	39	71	66		505
Elect. & Comm.	241	45	42	76		404
Other	398	184	66	179		827
Total Procurement	2465	1372	517	2665		7019
RDT&E	28	53	*	71		152
Military Construction						
South Vietnam	408	207	*	110		725
Other Locations	172	83	*	198		453
Planning	30	15	*	16		61
Total Program	610	305	*	324		1238
To be Approp. to Mil. Dept.	510	255	*	274		1038
To be Approp. to Def. Agencies					200	200
Total Appropriation	510	255	*	274	200	1238

* Included in the Navy.

Note: Detail may not add to totals due to rounding.

Table 4

Financial Summary of FY 1966 Budget Including the Proposed Supplemental for Southeast Asia

(IN THOUSANDS OF DOLLARS)

	NOA Enacted Excluding Amendment	$1,700 Million Amendment	Military and Civilian Pay Supplemental	S.E.A. Supplemental	Total NOA
MILITARY PERSONNEL					
Military Personnel, Army	4,092,291	------	222,100	833,600	5,147,991
Military Personnel, Navy	3,055,000	------	182,600	318,500	3,556,100
Military Personnel, M.C.	749,900	------	42,400	184,600	976,900
Military Personnel, A.F.	4,393,800	------	227,600	219,300	4,840,700
National Guard Personnel, Army	271,800	------	4,500	45,900	322,200
Reserve Personnel, Army	238,600	------	------	7,500	246,100
National Guard Personnel, A.F.	71,300	------	3,500	5,700	80,500
Reserve Personnel, Navy	105,100	------	4,600	------	109,700
Reserve Personnel, M.C.	33,000	------	1,600	2,200	36,800
Reserve Personnel, A.F.	60,500	------	1,200	2,700	64,400
Retired Pay, Defense	1,529,000	------	71,000	------	1,600,000
Total Military Personnel	14,600,291	------	761,100	1,620,000	16,981,391
OPERATION & MAINTENANCE					
Oper. & Maint., Army	3,434,067	------	33,400	1,077,200	4,544,667
Oper. & Maint., Navy	3,292,137	------	23,000	506,000	3,821,137
Oper. & Maint., M.C.	192,101	------	1,054	102,600	295,755
Oper. & Maint., A.F.	4,403,737	------	27,600	544,900	4,976,237
Oper. & Maint., Def. Agencies	683,680	------	14,356	41,769	739,805
O&M, Army National Guard	208,796	------	2,000	35,700	246,496
O&M, Air National Guard	238,000	------	1,000	8,100	247,100
National Bd for Prom.R.P., Army	459	------	------	------	459
Claims, Defense	24,000	------	------	------	24,000

Table 4—Continued

Financial Summary of FY 1966 Budget Including the Proposed Supplemental for Southeast Asia

(IN THOUSANDS OF DOLLARS)

Contingencies, Defense	15,000	------	------	------	15,000
Ct of Mil. Appeals, Defense	579	------	11	------	590
Total Oper. & Maint.	12,492,556	------	102,421	2,316,269	14,911,246
PROCUREMENT					
Proc. of Equip. & Msls, Army	1,204,800	504,500	------	2,465,000	4,174,300
Proc. of A/C & Msls, Navy	2,220,387	190,200	------	764,500	3,175,087
Shipbldg. & Conv., Navy	1,590,500	------	------	------	1,590,500
Other Procurement, Navy	1,135,000	167,090	------	607,500	1,909,590
Procurement, M.C.	43,800	149,100	------	516,600	709,500
A/C Proc., Air Force	3,516,700	158,800	------	1,585,700	5,261,200
Missile Proc., Air Force	771,900	4,000	------	63,700	839,600
Other Proc., Air Force	829,100	360,600	------	1,016,400	2,206,100
Proc., Defense Agencies	15,200	------	------	------	15,200
Total Procurement	11,327,387	1,534,290	------	7,019,400	19,881,077
RES., DEV., TEST, & EVAL.					
RDT&E, Army	1,433,988	------	------	27,995	1,461,983
RDT&E, Navy	1,513,130	------	------	52,570	1,565,700
RDT&E, Air Force	3,181,956	------	------	71,085	3,253,041
RDT&E, Defense Agencies	491,300	------	------	------	491,300
Emergency Fund, Defense	19,426	------	------	------	19,426
Total—RDT&E	6,639,800	------	------	151,650	6,791,450
MILITARY CONSTRUCTION					
Military Constr., Army	346,843	64,600	------	509,700	921,143
Military Constr., Navy	329,405	43,210	------	254,600	627,215
Military Constr., A.F.	361,773	57,900	------	274,100	693,773
Mil. Con., Def. Agencies	19,768	------	------	200,000	219,768
Mil. Con., Army Res.	------	------	------	------	------
Mil. Con., Naval Res.	9,500	------	------	------	9,500
Mil. Con., A.F. Res.	4,000	------	------	------	4,000
Mil Con., Army N.G.	10,000	------	------	------	10,000
Mil Con., Air N.G.	10,000	------	------	------	10,000
Loran Stations, Defense	5,000	------	------	------	5,000
Total—Mil. Constr.	1,096,289	165,710	------	1,238,400	2,500,399
FAMILY HOUSING					
Family Housing, Defense	665,846	------	------	------	665,846
CIVIL DEFENSE					
O&M, Civil Defense	64,066	------	------	------	64,066
Research, Shelter Survey and Marking, Civ. Def.	42,700	------	------	------	42,700
Total—Civil Defense	106,766	------	------	------	106,766
Total—Mil. Functions	46,928,935	1,700,000	863,521	12,345,719	61,838,175
MILITARY ASSISTANCE					
Military Ass't., Executive	1,470,000	------	------	------	1,470,000
TOTAL—DEPT OF DEFENSE	48,398,935	1,700,000	863,521	12,345,719	63,308,175
RECAPITULATION					
Army	11,241,644	569,100	262,000	5,002,595	17,075,339
Navy	14,268,960	549,600	255,254	3,309,670	18,383,484
Air Force	17,842,766	581,300	260,906	3,791,685	22,476,651
Defense Agencies	3,468,799	------	85,367	241,769	3,795,935
Civil Defense	106,766	------	------	------	106,766
Military Assistance	1,470,000	------	------	------	1,470,000
TOTAL	48,398,935	1,700,000	863,521	12,345,719	63,308,175

Table 5

Amounts Requested for Aircraft, Missiles, Ships and Tracked Combat Vehicle Procurement Authorization in FY 1966 Supplemental Request

(IN THOUSANDS)

	Authorized [a] FY 1966	Appropriated [a] FY 1966	Supplemental (NOA) FY 1966
Aircraft			
Army	485,400	485,400	825,600
Navy & Marine Corps	2,100,400	2,104,500	738,300
Air Force	3,709,000	3,675,800	1,585,700
Missiles			
Army	253,700	277,000	64,000
Navy	369,600	358,200	26,200
Marine Corps	15,200	15,200	27,500
Air Force	800,100	800,100	63,700
Naval Vessels			
Navy	1,721,000	1,590,500	------
Tracked Combat Vehicles			
Army	------	------	75,800
Marine Corps	------	------	10,900
Totals	9,454,400	9,306,700	3,417,700

[a] Included amounts totaling $496.1 million provided thru Emergency Fund SEA, PL 89-213.

Table 6

Source of Funds for Aircraft, Missiles, Ships and Tracked Combat Vehicles FY 1966 Supplemental Procurement Program

(IN THOUSANDS)

	Total FY 1966 Program	Funding Available [a] for Financing Program in Part	NOA Requested for Authorization
Aircraft			
Procurement of Equipment and Missiles, Army	1,333,200	507,600	825,600
Procurement of Aircraft and Missiles, Navy (and Marine Corps).	3,224,000	2,485,700	738,300
Aircraft Procurement, Air Force	5,596,200	4,010,500	1,585,700
Sub-Total—Aircraft	10,153,400	7,003,800	3,149,600
Missiles			
Procurement of Equipment and Missiles, Army	368,600	304,600	64,000
Procurement of Aircraft and Missiles, Navy	381,600	355,400	26,200
Procurement, Marine Corps	42,700	15,200	27,500
Missile Procurement, Air Force	1,242,800	1,179,100	63,700
Sub-Total—Missiles	2,035,700	1,854,300	181,400
Naval Vessels			
Shipbuilding and Conversion, Navy	1,930,500	1,930,500	------
Tracked Combat Vehicles			
Procurement of Equipment and Missiles, Army	375,700	299,900	75,800
Procurement, Marine Corps	13,400	2,500	10,900
Sub-Total—Tracked Combat Vehicles	389,100	302,400	86,700
GRAND TOTAL	14,508,700	11,091,000	3,417,700

[a] Includes total amount of $496.1 million provided thru Emergency Fund SEA, PL 89-213.

Table 7

Amounts Requested for RDT&E Authorization in FY 1966 Supplemental Request

(IN THOUSANDS)

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION	Authorized FY 1966	Appropriated FY 1966	Supplemental (NOA) FY 1966
Army	$1,406,400	$1,406,400	$ 27,995
Navy (including the Marine Corps)	1,439,200	1,439,200	52,570
Air Force	3,103,900	3,103,900	71,085
Defense Agencies	495,000	495,000	------
Emergency Fund	n/a	125,000	------
Total	$6,444,500	$6,569,500	

Subcontracting Spreads Dollar

(*Continued from Page 19*)

For example, Rohr Corp. of Chula Vista, Calif., largest C–141 subcontractor, sublets 49 percent of its contract on engine nacelles. Companies receiving this 49 percent from Rohr, in turn sublet 40 percent of their part to other firms. Rohr's subcontractors at the time the study was made totaled $85.9 million; since then additional millions are being negotiated for follow-on C–141's.

The defense dollar that goes from Lockheed in Georgia to General Dynamics/Convair in San Diego, Calif., another major subcontractor, drifts downward through four levels. Convair builds the empennage for the Starlifter. At the time of the study, Convair's subcontract amounted to $43.2 million and negotiations are under way for follow-on C–141's. Convair sublet 25 percent. Recipients of this portion, in turn, sublet 20 percent to others. The third group of companies sublet 10 percent.

Before the C–141 program began in 1961, prime contractors subcontracted about one-third of their program received from the Defense Department. Lockheed-Georgia sublet 35 percent of the C–130 aircraft program. On the C–141 program, however, Lockheed established a record by subletting approximately 62 percent.

The Defense Department encourages this type of dollar sharing. So, when the C–5A competition came along, Lockheed proposed subcontracting the same amount. Douglas and Boeing, competing for the C–5A, likewise offered tremendous subcontracting programs.

Within the next few months, firms all over America will be building parts and systems of the C–5A to send to Marietta, Ga., for assembly with the in-house-built pieces into the world's biggest airplane. Defense dollars already are being spent throughout the nation to obtain raw material for production.

Changes In Army Aviation Program

(*Continued from Page 21*)

Army divisions gave us a capability which no other Army in the world possesses.

On July 3 the 11th Air Assault Division was officially designated the 1st Cavalry Division (Airmobile) at Fort Benning, Ga. For the first time in 22 years the colors of the 1st Cavalry were in the United States; but they were not to remain here long. In view of the requirement for additional U.S. forces in Vietnam, it was only logical that the 1st Air Cavalry Division be considered for deployment. After intensified training, the division deployed to Vietnam, arriving in mid-September.

The tempo of activities of the 1st Cavalry Division can be expected to increase sharply in the next few months. I would, however, like to sound a word of caution. The division has received much attention and has perhaps gotten too great a buildup as to what can be expected of it. This could lead to disappointment. We expect tht division to pull its weight in the Republic of Vietnam, but no one division is going to clean up that messy war and we should not look for miracles.

The FDL Ship Project

(*Continued from Page 6*)

tition by the prime contractor for such team members during the final phases of source selection for the total package contract.

The major in-house effects expected in this area are a shift in design emphasis and provision for major industry input into the contract definition process. The planned use of ship performance requirements and standards, instead of detailed ship specifications, is intended to elicit industry's maximum ingenuity and engineering inventiveness during this phase. This approach is expected to strengthen the overall ship design capabilities in this country.

Figure I relates the FDL Ship Project Office to the Naval Establishment. Of particular importance for this Secretary of the Navy-designated project is the "unitary" aspect of the office with reporting responsibility to the Secretary of the Navy through both the Chief of Naval Material and the Chief of Naval Operations for their respective areas or responsibility. This unique combination of both the user and the producer aspects of the ship procurement equation is expected to facilitate the introduction of the new procedures I have described to the ship acquisition process. Figure II delineates the FDL Ship Project organization as it now exists.

In summary, our goals are to carry out trial applications of contract definition and total package concept for ship procurement while developing a seaborne rapid deployment system.

DEFENSE PROCUREMENT

Contracts of $1,000,000 and over awarded during the month of January 1966:

DEFENSE SUPPLY AGENCY

3—**B. G. Colton Division of Raylon Fabrics,** New York City. $3,883,970. 2,336,000 linear yards of cotton and nylon sateen cloth. Lanett, Ala. and Westerly, R.I. Defense Personnel Support Center, Philadelphia.

—**Erwin Mills Division of Burlington Industries,** New York City. $1,161,764. 1,161,000 linear yards of cotton and nylon sateen cloth. Cooleemee, N.C. Defense Personnel Support Center, Philadelphia.

—**C. M. London Co.,** New York City. $2,183,173. 1,342,500 linear yards of cotton and nylon sateen cloth. Greenville, S.C. and Bradford, R.I. Defense Personnel Support Center, Philadelphia.

4—**Cleveland Woolens Division of Burlington Industries,** Cleveland, Tenn. $1,638,187. 200,000 woolen blankets. Cleveland. Defense Personnel Support Center, Philadelphia.

5—**Southern Athletic Co.,** Knoxville, Tenn. $1,635,000. 500,000 pairs of men's cotton poplin trousers. Knoxville. Defense Personnel Support Center, Philadelphia.

7—**Go Con Corp.,** Dallas, Tex. $1,598,917. 4,217 large general purpose tents with covers. Jacksonville, Tex. Defense Personnel Support Center, Philadelphia.

10—**Socony Mobil Oil Co.,** New York City. $2,668,882. Petroleum products to be delivered to various posts and stations on the east coast. Defense Fuel Supply Center, Alexandria, Va.

—**Shell Oil Co.,** New York City. $1,089,223. Petroleum products to be delivered to various posts and stations on the east coast. Defense Fuel Supply Center, Alexandria, Va.

13—**Stewart Avionics,** Brooklyn, N.Y. $1,328,798. 814 sets of portable flood lights. Defense General Supply Agency, Richmond, Va.

20—**Riegel Textile Corp.,** New York City. $3,084,600. Six million yards of cotton sateen cloth. Trion, Ga. Defense Personnel Support Center, Philadelphia.

—**J. P. Stevens And Co.,** New York City. $1,989,049. 3,958,000 yards of cotton sateen cloth. Rock Hill, Piedmont, Mohawk and Wallace, S.C. Defense Personnel Support Center, Philadelphia.

—**B. G. Colton Division of Raylon Fabrics,** New York City. $1,146,165. 2,100,000 yards of cotton sateen cloth. Monroe and Columbus, Ga.; Memphis, Tenn. and Batesburg, S.C. Defense Personnel Support Center, Philadelphia.

21—**Warren Co.,** Atlanta, Ga. $1,270,556. 1,946 refrigerators. Atlanta. Defense General Supply Center, Richmond, Va.

—**Dowling Bag Co.,** Valdosta, Ga. $1,077,600. 4,800,000 sand bags. Valdosta and Savannah, Ga. Defense General Supply Center, Richmond, Va.

26—**Southern Athletic Co.,** Knoxville, Tenn. $1,095,600. 220,000 men's cotton poplin wind-resistant coats. Knoxville. Defense Personnel Support Center, Philadelphia.

—**Fab-Weld Corp.,** Simpson, Pa. $4,662,000. 18,000 metal shipping boxes. Simpson. Defense General Supply Center, Richmond, Va.

—**Medart Products,** St. Louis. $1,402,644. 108,062 steel clothing lockers. Greenwood, Miss. Defense General Supply Center, Richmond, Va.

—**Clark Wire Corp.,** Cleveland, Ohio. $5,470,000. 500,000 coils of concertina wire. Ironton, Ohio. Defense Construction Supply Center, Columbus, Ohio.

—**Northwestern Steel & Wire Co.,** Sterling, Ill. $1,635,023. 162,044 coils of concertina wire. Sterling. Defense Construction Supply Center, Columbus, Ohio.

—**Lanes Myers Co.,** Protection, Kan. $1,360,500. 150,000 coils of concertina wire. Protection. Defense Construction Supply Center, Columbus, Ohio.

ARMY

3—**Switlik Parachute Co.,** Trenton, N.J. $1,128,419. Personnel parachutes. Trenton. Army Aviation Materiel Command, St. Louis.

—**Acronetics Division of General Time Corp.,** Stamford, Conn. $2,752,000. Bomb fuzes. Gadsden, Ala. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Continental Motors,** Muskegon, Mich. $1,039,113. Tank engine assemblies. Muskegon. Army Tank Automotive Center, Warren, Mich.

—**LTV Michigan Division of LTV Aerospace Corp.,** Warren, Mich. $1,957,656. Industrial services and documentation for the LANCE missile. Warren. Army Missile Plant, Warren, Mich.

—**Remington Arms Co.,** Bridgeport, Conn. $8,293,000. 7.62mm cartridges. Bridgeport. Frankford Arsenal, Philadelphia.

—**Olin-Mathieson Chemical Corp.,** East Alton, Ill. $1,994,312. 5.56mm cartridges. East Alton. Frankford Arsenal, Philadelphia.

—**Jackes-Evans Mfg. Co.,** St. Louis. $2,550,266. 7.62mm metalic belt cartridges. St. Louis. Frankford Arsenal, Philadelphia.

—**Eisen Bros.,** Hoboken, N.J. $1,619,621. Metal parts assemblies for hand grenades. Lodi, N.J. Ammunition Procurement and Supply Agency, Joliet, Ill.

—**Supreme Products Corp.,** Chicago. $2,525,025. Ordnance parts. Chicago. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Ingraham Co.,** Bristol, Conn. $3,312,650. Ordnance items. Waterbury and Bristol, Conn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Time Corp.,** LaSalle, Ill. $3,285,480. Ordnance items. Peru, Ill. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Honeywell, Inc.,** Hopkins, Minn. $2,608,131. Automatic assembly and support equipment for 40mm projectiles. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Trenton Textile Engineering and Manufacturing Co.,** Trenton, N.J. $1,294,145. Ordnance items. Trenton and Philadelphia. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Eagle Picher,** Joplin, Mo. $2,157,840. Ordnance items. Joplin. Harry Diamond Laboratories, Washington, D.C.

—**Olin Mathieson Chemical Corp.,** East Alton, Ill. $9,487,488. 7.62mm ammunition. East Alton. Frankford Arsenal, Philadelphia.

—**Olin Mathieson Chemical Corp.,** New Haven, Conn. $15,694,800. 7.62mm ammunition. New Haven. Frankford Arsenal, Philadelphia.

—**Technical Operations, Inc.,** Burlington, Mass. $3,200,000. 12-month program to supply scientific and operations research support for the Combat Development Command. Fort Belvoir and Fort Lee, Va. Northwest Procurement Agency, Oakland, Calif.

4—**AVCO Corp.,** Cincinnati, Ohio. $2,851,100. Operation, modification and maintenance of missile tracking and instrumentation radars and interfacing equipment. White Sands Missile Range, N.M. White Sands Missile Range Headquarters, N.M.

5—**American Dredging Co.,** Philadelphia. $3,852,000. Dredging work at the Wilmington Harbor, N.C., project. Engineer Dist., Wilmington, N.C.

6—**Collins Radio Co.,** Dallas, Tex. $2,371,569. Radio sets (AN/ARC–54). Dallas. Army Electronics Command, Fort Monmouth, N.J.

—**Collins Radio Co.,** Cedar Rapids, Iowa. $1,494,672. Radio sets (AN/ARC–102). Cedar Rapids. Army Electronics Command, Fort Monmouth, N.J.

7—**Eugene Luhr and Co., Massman Construction Co. and Patton-Tully Transportation Co.,** Columbia, Ill. $1,986,000. Work on Mississippi River Project. Cairo and Chester, Ill. Engineer Dist., St. Louis.

—**Wilcox Electric Co.,** Kansas City, Mo. $1,000,000. Electronics equipment. Army Electronics Command, Fort Monmouth, N.J.

—**Boeing Co.,** Morton, Pa. $1,284,625. Production equipment for aircraft. Morton. Army Aviation Materiel Command, St. Louis.

—**AVCO Corp.,** Stratford, Conn. $1,062,328. T–53–L–7 engines for the OV–1 aircraft. Stratford. Army Aviation Materiel Command, St. Louis.

8—**Studebaker Corp.,** Minneapolis, Minn. $1,797,000. 60-cycle generator sets. Minneapolis. Army Mobility Equipment Center, St. Louis.

10—**Holston Defense Corp.,** Kingsport, Tenn. $1,488,875. Explosives and propellants of various types. Kingsport. Ammunition Procurement & Supply Agency, Joliet, Ill.

11—**Weaver Construction Co.,** Denver, Colo. $2,938,000. Construction of four motor repair shops and facilities at Fort Carson, Colo. Engineer Dist., Omaha, Neb.

—**Universal Constructors, Inc.,** Albuquerque, N.M. $2,274,075. Work on the Cochiti Dam and Reservoir, Rio Grande, N.M. Engineer Dist., Albuquerque, N.M.

12—**Raytheon Co.,** Lexington, Mass. $2,176,000. Work on the design and development of the HAWK anti-tactical ballistic missile system. Bedford, Mass. Army Missile Command, Huntsville, Ala.

—**Sylvania Electric Products,** Needham, Mass. $1,500,000. Production of classified electronics equipment. Needham. Army Electronics Command, Fort Monmouth, N.J.

—**Olin Mathieson Chemical Corp.,** New York City. $1,039,030. Partial re-activation of Badger Army Ammunition Plant, Baraboo, Wis. and production of small arms ammunition. New York City. Ammunition Procurement & Supply Agency, Joliet, Ill.

14—**Federal Cartridge Corp.,** Minneapolis. $3,779,934. Loading, assembly and packing of 7.62mm ammunition. Minneapolis. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Remington Arms Co.,** Bridgeport, Conn. $7,369,892. Loading, assembly and packing of 7.62mm and 20mm ammunition. Independence Mo. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Day & Zimmermann,** Philadelphia. $5,792,714. Loading, assembly and packing of 60mm rockets and components. Texarkana, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Martin K. Eby Construction Co.,** Wichita, Kan. $1,778,942. Work on Gillham Dam and Reservoir, Arkansas Project. DeQueen, Ark. Engineer Dist., Tulsa, Okla.

—**Pensacola Construction Co.,** Kansas City, Mo. $1,072,082. Bank stabilization work on the Arkansas River Project. Gould, Ark. Engineer Dist., Little Rock, Ark.

—**General Electric Co.,** Burlington, Vt. $5,089,491. 7.62mm aircraft machine guns, pods and repair parts to support the Air Force and Army firing program. Burlington. Army Weapons Command, Rock Island, Ill.

—**Connecticut Cartridge Corp.,** Plainville, Conn. $1,350,000. 20mm cartridge cases. Plainville. Frankford Arsenal, Philadelphia.

—**Martin Marietta Corp.,** Orlando, Fla. $3,900,000. Research and development of improved ground support equipment for the PERSHING weapon system. Orlando. Army Missile Command, Huntsville, Ala.

17—**Emerson Electric Co.,** St. Louis. $2,362,130. Helicopter armament sub-systems. St. Louis, and Mount Pleasant, Iowa. Army Weapons Command, Rock Island, Ill.

—**Johnson Furnance Co.,** Bellevue, Ohio. $6,102,523. Production of 1½-ton cargo trailers and 1½-ton trailer chassis. Bellevue. Army Tank Automotive Center, Warren, Mich.

—**Global Associates,** Oakland, Calif. $6,285,181. Base logistics support, Kwajalein Test Site. Kwajalein Atoll, Marshall Islands NIKE X Project Office, Huntsville, Ala.

18—**William A. Smith Construction Co.,** Kansas City, Kan. $5,807,793. Work on the Red Rock Dam and Reservoir, Des Moines River, Iowa, Project. Knoxville, Iowa. Engineer Dist., Rock Island, Ill.

—**Raytheon Co.,** Waltham, Mass. $1,016,618. Electron tubes for the HAWK missile system transmitter. Waltham. Army Electronics Command, Philadelphia.

—**Continental Aviation & Engineering Corp.,** Detroit. $1,037,277. Continuation of production engineering services for engines applicable to 2½ and 5-ton trucks. Detroit. General Purpose Vehicle Project Manager, Warren, Mich.

—**Honeywell, Inc.**, North Hopkins, Minn. $10,017,000. Batteries for the M532 fuze. New Brighton, Minn. Harry Diamond Laboratories, Washington, D.C.

19—**Bendix Corp.**, Teterboro, N.J. $1,170,062. Stabilizer platforms for the PERSHING missile system. Teterboro. Army Missile Command, Huntsville, Ala.

—**Jayval Company of New Mexico**, Las Vegas, N.M. $2,595,994. Cargo parachutes (100 foot canopy). Las Vegas. Army Aviation Materiel Command, St. Louis.

—**Philco Corp.**, Newport Beach, Calif. $5,-200,000. Continued research and development in support of the CHAPARRAL air defense system. Newport Beach. Army Missile Command, Huntsville, Ala.

—**Hensel Phelps Construction Co.**, Greeley, Colo. $6,904,770. Construction of cadet quarters and formation areas, and utilities at the Air Force Academy, Colorado Springs, Colo. Engineer Dist., Omaha, Neb.

20—**Campbell Construction Co.**, Sacramento, Calif. $2,160,820. Construction of a two-story logistics facility at McClellan AFB, Calif. Engineer Dist., Sacramento, Calif.

—**General Motors**, Detroit. $4,550,400. 81mm components. Warren and Saginaw, Mich. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**AVCO Corp.**, Richmond, Ind. $5,034,926. Classified ammunition. Richmond. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Honeywell Inc.**, Hopkins, Minn. $6,363,958. Classified ammunition. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Batesville Mfg. Co.**, Batesville, Ark. $4,-545,684. Classified ammunition. Batesville. Ammunition Procurement & Supply Agency, Joliet Ill.

—**Amron Corp.**, Waukesha, Wis. $6,962,349. Classified ammunition. Waukesha. Ammunition Procurement & Supply Agency, Joliet, Ill.

21—**Kaiser Jeep Corp.**, Toledo, Ohio. $2,333,765. 5-ton trucks. South Bend, Ind. Army Mobility Command, Warren, Mich.

—**Sylvania Electric Products**, Williamsville, N.Y. $3,469,304. Development and production of electronics equipment for the light observation helicopter. Williamsville. Army Electronics Command, Fort Monmouth, N.J.

—**RCA**, Camden, N.J. $1,503,200. Components for AN/PRC–25 radio sets. Camden. Army Electronics Command, Philadelphia.

24—**Fred R. Comb, Jr., Inc.**, Minneapolis. $1,-387,482. Construction of an addition to a logistics facility at Tinker AFB, Okla. Engineer Dist., Fort Worth, Tex.

25—**International Harvester Co.**, Wash., D.C. $1,444,887. 426 cargo trucks. Springfield, Ohio. Army Tank Automotive Center, Warren, Mich.

—**Chrysler Corp.**, Detroit. $10,047,537. M60A1E1 turret systems. Warren, Mich. Army Weapons Command, Rock Island, Ill.

—**Atlas Construction Co.**, Ruston, La. $2,-028,700. Casting and furnishing of concrete squares for the Mississippi River and Tributaries Project. St. Francisville, La. Engineer Dist., New Orleans.

—**Hercules Powder Co.**, Wilmington, Del. $2,000,830. Reactivation work at the Sunflower Army Ammunition Plant, Lawrence, Kan. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Browning Construction Co.**, San Antonio, Tex. $1,370,808. Construction of additional assembly facilities for the Globe Helicopter Plant, Saginaw, Tex. Engineer Dist., Fort Worth, Tex.

26—**Honeywell, Inc.**, Tampa, Fla. $2,000,000. Classified electronic equipment. Tampa. Army Electronics Command, Fort Monmouth, N.J.

—**Grand Machine Co.**, Detroit. $2,032,200. 81mm mortar shell assemblies. Detroit. Army Procurement Detachment, Chicago.

—**Firestone Tire & Rubber Co.**, Akron, Ohio. $1,239,427. Metal parts for the SHILLELAGH missile system. Akron. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Hamilton Watch Co.**, Lancaster, Pa. $7,-865,550. Ordnance components. Lancaster. Ammunition Procurement and Supply Agency, Joliet, Ill.

—**Bell Helicopter Co.**, Fort Worth, Tex. $4,-905,000. $7,377,086. Two delivery order for UH–1 helicopter rotary wing blade and main blade assemblies. Fort Worth. Army Aviation Materiel Command, St. Louis.

27—**Belzak & Goudeseune, Inc., and John A. Artukovich Sons, Inc.**, Paramount, Calif. $2,367,580. Work on the Los Angeles County drainage area project. La Verne, Calif. Engineer Dist., Los Angeles.

—**Ford Motor Co.**, Dearborn, Mich. $2,312,-588. 1,284 nine-passenger station wagons. Dearborn. Army Tank Automotive Center, Warren, Mich.

—**General Motors**, Detroit. $2,795,977. 1,088 delivery trucks. Union City, Ind. Army Tank Automotive Center, Warren, Mich.

—**International Harvester Co.**, Wash., D.C. $3,089,281. 1,044 pickup trucks. Springfield, Ohio. Army Tank Automotive Center, Warren, Mich.

—**Greenhut Construction Co.**, Pensacola, Fla. $1,124,224. Construction of two maintenance docks. Robins AFB, Ga. Engineer Dist., Savannah, Ga.

—**Honeywell, Inc.**, North Hopkins, Minn. $1,-068,519. Ordnance components. New Brighton, Minn. Ammunition Procurement and Supply Agency, Joliet, Ill.

28—**Federal Cartridge Corp.**, Minneapolis. $9,155,900. 5.56mm cartridges. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Goodyear Tire & Rubber Co.**, Akron, Ohio. $3,977,822. Shoe assemblies for the M578 recovery vehicle. Muncie, Ind. Army Tank Automotive Center, Warren, Mich.

—**Gahagan Dredging Corp.**, New York City. $1,403,000. Work on the Texas City, Tex., Channel Project. Engineer Dist., Galveston, Tex.

NAVY

3—**Boeing Co.**, Vertol Div., Morton, Pa. $11,-100,000. Long lead time support items for UH/CH–46A helicopters. Morton. Bureau of Naval Weapons.

—**Vitro Laboratories**, Silver Spring, Md. $2,850,992. Classified subsystem of the POLARIS missile. Silver Spring. Special Project Office.

4—**Hughes Aircraft**, Culver City, Calif. $12,-000,000. Work on PHOENIX missile system. Culver City. Bureau of Naval Weapons.

—**Magnavox Co.**, Fort Wayne, Ind. $2,044,-038. Avionics components for an ASW identification system. Fort Wayne. Aviation Supply Office, Philadelphia.

—**Melpar, Inc.**, Falls Church, Va. $2,369,314. A–7A weapon system trainers. Falls Church. Naval Training Device Center, Port Washington, N.Y.

—**General Precision, Inc.**, Binghampton, N.Y. $1,158,635. Production units of A–7A weapon system trainers. Palo Alto, Calif. Naval Training Device Center, Port Washington, N.Y.

—**Teledyne, Inc.**, Gardena, Calif. $1,092,915. Electrical equipment. Gardena. Bureau of Yards and Docks.

5—**Westinghouse Corp.**, Pittsburgh, Pa. $2,-065,500. Design and furnish reactor plant components for nuclear powered submarines. Pittsburgh. Bureau of Ships.

—**Standard Armament**, Glendale, Calif. $1,-987,370. Bomb ejector racks. Glendale. Navy Aviation Supply Office, Philadelphia.

—**General Dynamics**, Rochester, N.Y. $1,-181,669. AN/ARR–52A radio receiver sets for use on S–2E and P–3A aircraft. Rochester. Navy Aviation Supply Office, Philadelphia.

—**Alcan Aluminum Corp.**, Riverside, Calif. $6,777,122. Rocket motors for 5" ZUNI rockets. Riverside. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Norris Thermador Corp.**, Vernon, Calif. $6,542,619. Rocket motors for 5" ZUNI rockets. Vernon. Navy Ships Parts Control Center, Mechanicsburg, Pa.

6—**General Electric**, Schenectady, N.Y. $5,-110,000. Design and furnish nuclear submarine reactor plant components. Schenectady. Bureau of Ships.

7—**Pennsylvania State University, Ordnance** Research Laboratory, University Park, Pa. $8,337,584. Continued R&D of the Mark 48 torpedo. University Park. Bureau of Naval Weapons.

—**North American Aviation**, Columbus, Ohio. $4,590,000 and $1,500,000. Conversion of A–5A weapon systems to RA–5C configuration and shipboard integrated operational intelligence centers. Columbus. Bureau of Naval Weapons.

—**Todd Shipyards**, San Pedro, Calif. $1,780,-873. Work on USS HAMPSHIRE COUNTY (LST–819). San Pedro. Industrial Manager, Eleventh Naval Dist.

—**Bethlehem Steel Corp.**, San Pedro, Calif. $1,641,000. Work on USS PITKIN COUNTY (LST–1082). San Pedro. Industrial Manager, Eleventh Naval Dist.

—**Harbor Beatbuilding Co.**, Long Beach, Calif. $2,024,300. Work on USS SEDGWICK COUNTY (LST–1123). Long Beach. Industrial Manager, Eleventh Naval Dist.

—**National Steel & Shipbuilding Co.**, San Diego, Calif. $2,377,528. Work on USS IREDELL COUNTY (LST–839). San Diego. Industrial Manager, Eleventh Naval Dist.

10—**Miami Beach Yacht Corp.**, Miami Beach, Fla. $1,016,240. Construction of 26-foot plastic motor whaleboats. Miami. Bureau of Ships.

—**Collins Radio Co.**, Cedar Rapids, Iowa. $1,-606,187. Components for AN/ARC–9 radio sets used on Navy Aircraft. Cedar Rapids. Aviation Supply Office, Philadelphia.

—**Bendix Corp.**, Eatontown, N.J. $4,100,418. Components for the generating system (30–KDA) used on board F–4 aircraft. Eatontown. Navy Purchasing Office, Washington, D.C.

—**Bendix Corp.**, Baltimore, Md. $1,776,045. Components for the AN/AQA–5 indicator group used in P–3A aircraft. Baltimore. Aviation Supply Office, Philadelphia.

11—**Interstate Electronics Corp.**, Anaheim, Calif. $1,033,000. Radio frequency test instrumentation sets. Anaheim. Special Projects Office.

—**Raytheon Co.**, Bedford, Mass. $3,507,837. Advanced development model of an ASW radar. Bedford. Bureau of Ships.

—**Teledyne Systems Corp.**, Hawthorne, Calif. $12,500,000. Work on an Integrated Helicopter Avionics System for CH–53A helicopters for the Marine Corps. Hawthorne. Bureau of Naval Weapons.

—**Pascoe Steel Corp.**, Pomona, Calif. $1,-144,873 and $4,838,470. Pontoon assemblies for use on ships. Columbus, Ga. and Pomona. Navy Purchasing Office, Los Angeles.

12—**Westinghouse Electric**, Baltimore, Md. $12,400,900. MK 48 torpedoes. Baltimore. Bureau of Naval Weapons.

—**Goodyear Aerospace Corp.**, Akron, Ohio. $18,588,205. SUBROC missiles and related equipment. Akron. Bureau of Naval Weapons.

—**General Motors**, Indianapolis, Ind. $2,-253,440. Kits to support engines used in P–3B aircraft. Indianapolis. Navy Aviation Supply Office, Philadelphia.

—**Boeing Co.**, Seattle, Wash. $3,800,000. Design and construction of a prototype hydrofoil gunboat. Seattle. Bureau of Ships.

—**Grumman Aircraft Engineering Corp.**, Bethpage, N.Y. $3,800,000. Design and construction of a prototype hydrofoil gunboat. Bethpage. Bureau of Ships.

13—**Westinghouse Corp.**, Baltimore, Md. $1,-240,826. Diving services of the Deepstar Submersible Vessel to support current Bureau of Ships deep submergence operations and environment research projects. Various locations in the Pacific Ocean and the Caribbean. Navy Purchasing Office, Los Angeles.

—**Raytheon Co.**, Portsmouth, R.I. $1,246,100. One integrated submarine sonar system. Portsmouth. Bureau of Ships.

14—**Sylvania Electric Products**, Mountain View, Calif. $13,095,638. Classified electronics equipment. Mountain View. Bureau of Ships.

17—**Norris Thermador Corp.**, Los Angeles. $33,329,034. Motor tubes for the 2.75 rocket. Los Angeles. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Lockheed Aircraft Corp.**, Burbank, Calif. $83,674,205. Production of P–3B aircraft. Burbank. Bureau of Naval Weapons.

—**Radiation, Inc.**, Melbourne, Fla. $3,133,-953. Digital communication sets for Navy aircraft. Melbourne. Bureau of Naval Weapons.

—**Bethlehem Steel Co.**, San Pedro, Calif. $1,144,875. Repair and alteration of the land ship dock USS COMSTOCK (LSD–19). San Pedro. Industrial Manager, Eleventh Naval Dist.

—**Lockheed Missiles & Space Co.**, Sunnyvale, Calif. $23,824,805. Research and development on the Fleet Ballistic Missile System. Sunnyvale. Special Projects Office.

18—**Metal Disintegrating, Inc.**, Elizabeth, N.J. $19,258,254. Aluminum components for SNAKEYE 1 and 2. Union, N.J. and Berkeley, Calif. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Aluminum Company of America,** Pittsburgh, Pa. $18,670,714. Aluminum components for SNAKEYE 1 and 2. Alcoa, Tenn.; Rockdale, Tex. and Loggan's Ferry, Pa. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Dow Chemical Co.,** Midland, Mich. $2,418,000. 2.75" rockets. Findley, Ohio. Navy Propellant Plant, Indian Head, Md.

—**United Aircraft,** East Hartford, Conn. $2,248,232. Assemblies to support jet engines in F–100 and F–102 aircraft. East Hartford. Navy Aviation Supply Office, Philadelphia.

19—**General Dynamics,** Pomona, Calif. $1,176,615. Guidance control systems for the TERRIER missile. Pomona. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**James E. Cox Construction,** Charlotte, N.C. $1,008,101. Construction of aircraft maintenance shops at Marine Corps Air Station, Cherry Point, N.C. Dir., Atlantic Div., Bureau of Yards and Docks.

20—**United Aircraft,** Pratt & Whitney Div., East Hartford, Conn. $37,813,464. TF33 engines for the Air Force. East Hartford. Bureau of Naval Weapons.

—**University of Alaska,** College, Alaska. $1,208,110. Research in arctic problems. Point Barrow, Alaska. Office of Naval Research.

21—**United Aircraft,** East Hartford, Conn. $6,121,700. TF30 engines for Navy aircraft. East Hartford. Bureau of Naval Weapons.

—**Martin Marietta Corp.,** Orlando, Fla. $12,085,430. Production of WALLEYE weapon system and related equipment. Orlando. Bureau of Naval Weapons.

24—**General Electric,** Wash., D.C. $2,306,945. Acoustic devices, associated motor and cable assemblies, repair parts and engineering services. Schenectady, N.Y. Bureau of Ships.

—**Lear Siegler, Inc.,** Grand Rapids, Mich. $1,418,282. Components for bomb computer systems. Grand Rapids. Navy Purchasing Office, Wash., D.C.

—**William E. Arnold Co.,** Jacksonville, Fla. $6,896,400. Construction of a 400-bed hospital at Jacksonville, Fla. Dir., Southeast Div., Bureau of Yards & Docks.

—**Todd Shipyards,** Alameda, Calif. $1,969,190. Activation of the tank landing ship USS GARRETT COUNTY (LST–786). Alameda. Industrial Manager, 12th Naval Dist.

—**Triple A Machine Shop,** San Francisco. $1,992,600. Activation of the tank landing ship USS HARNETT COUNTY (LST–821). San Francisco. Industrial Manager, 12th Naval Dist.

—**Bendix Corp.,** Baltimore, Md. $1,312,765. AN/PRC–47 radio sets. Baltimore. Headquarters, U.S. Marine Corps.

25—**American Mfg. Co. of Texas,** Fort Worth, Tex. $1,107,600. Five-inch 38 cal. projectiles. Fort Worth. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Lansdown Steel & Iron Co.,** Morton, Pa. $1,140,750. Five-inch 38 cal. projectiles. Navy Ships Parts Control Center, Mechanicsburg, Pa.

26—**Bethlehem Steel Corp.,** New York City. $47,814,000. Construction of two ammunition ships. Sparrows Point, Md. Bureau of Ships.

—**Loral Corp.,** Bronx, N.Y. $1,972,605. Doppler navigation radar sets for P–3A and A–7A aircraft. Bronx. Navy Purchasing Office, Washington, D.C.

27—**Franklin Institute,** Philadelphia. $6,852,748. Additional studies, evaluations and analyses of problems in naval warfare. Philadelphia. Office of Naval Research.

—**Grumman Aircraft Engineering Corp.,** Bethpage, N.Y. $5,600,000. Long lead time effort to support the FY 66 procurement of A–6A aircraft. Bethpage. Bureau of Naval Weapons.

—**Sanders Associates,** Nashua, N.H. $15,723,300. Production of classified electronic equipment. Nashua. Bureau of Naval Weapons.

28—**Honeywell, Inc.,** Minneapolis, Minn. $1,869,482. Rate indicating-integrating gyroscopes for F–4B and F–4D aircraft. Minneapolis. Navy Aviation Supply Office, Philadelphia.

AIR FORCE

3—**Sperry Rand Corp.,** Clearwater, Fla. $2,190,000. Antenna test sets. Clearwater. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Bell Aerosystems Co.,** Buffalo, N.Y. $7,700,000. Work on prototype rocket engines. Niagara Falls, N.Y. Space Systems Div. (AFSC), Los Angeles.

4—**Lockley Machine Co.,** New Castle, Pa. $1,132,350. Practice bombs. New Castle. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**Continental Aviation & Engineering Corp.,** Detroit. $2,416,482. Production of J–69 engines for T–37 trainer aircraft. Toledo, Ohio. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**North American Aviation,** Anaheim, Calif. $1,420,997. Spare parts for MINUTEMAN ground support equipment. Anaheim. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

5—**General Electric,** Cincinnati, Ohio. $1,500,000. A component improvement program for the J–79 aircraft engine. Evandale, Ohio. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Obio.

—**General Motors,** Indianapolis, Ind. $4,539,000. Production of T–56 aircraft engines and related equipment. Indianapolis. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Martin Marietta,** Orlando, Fla. $2,567,872. Production of communications equipment for F–4 and F–111 aircraft. Orlando. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Republic Aviation,** Farmingdale, N.Y. $1,222,075. Engineering services for F–105 aircraft. Farmingdale. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

6—**North American Aviation,** Anaheim, Calif. $13,811,030. Components of the improved MINUTEMAN guidance system. Anaheim. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**General Dynamics,** Fort Worth, Tex. $1,818,000. Inspection and repair of B–58 aircraft. For Worth. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

7—**General Electric,** Cincinnati, Obio. $4,000,000. Development work on a vectored thrust cruise propulsion system. Cincinnati. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Boeing Co.,** Wichita, Kan. $1,800,000. FY 1966 B–52 fleet support program. Wichita. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**Hughes Aircraft,** Culver City, Calif. $1,253,000. Work on an air to surface missile guidance program. Culver City. Systems Engineering Group, Research & Technology Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Aircraft Hydroforming Inc.,** Gardena, Calif. $1,650,649. Aircraft pylon bomb rack assemblies. Gardena. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

10—**United Aircraft,** East Hartford, Conn. $4,000,000. Development work on a vectored thrust cruise propulsion system. East Hartford. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Raytheon Co.,** Bedford, Mass. $1,283,000. Work on a rocket research program. Bedford. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Continental Aviation and Engineering Corp.,** Detroit, Mich. $1,260,350. Production of J–69 engines for T–37 aircraft. Toledo, Ohio. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Bendix Corp.,** Teterboro, N.M. $1,500,000. Production of aircraft navigational computer equipment. Teterboro. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

11—**Lear, Siegler, Inc.,** Grand Rapids, Mich. $1,400,589. Production of components for C–141 aircraft instruments. Grand Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

12—**Aerojet General Corp.,** Sacramento, Calif. $2,900,000. Production of components for the TITAN III system. Sacramento. Space Systems Div. (AFSC), Los Angeles.

—**RCA,** Camden, N.J. $1,248,795. Radar altimeters for F–4 aircraft. Camden. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Burroughs Corp.,** Paoli, Pa. $2,000,000. Modification of the Air Defense Back-Up Interceptor Control System. Paoli. Electronics Systems Div. (AFSC), L. G. Hanscom Field, Mass.

—**Lockheed Aircraft,** Sunnyvale, Calif. $2,000,000. Satellite control facility work. Sunnyvale. Air Force Satellite Control Facility (AFSC), Los Angeles.

13—**Lockheed Missiles & Space Co.,** Sunnyvale, Calif. $3,000,000. Production of AGENA boosters. Sunnyvale. Space Systems Div. (AFSC), Los Angeles.

14—**ITT Gilfillan Corp.,** Los Angeles. $1,122,840. Production of modification kits for radar ground controlled landing systems. Los Angeles. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**Pneumo Dynamics Corp.,** Kalamazoo, Mich. $7,442,734. Production of modification kits, spare parts and related equipment for C–130 aircraft. Grand Rapids, Mich. Warner-Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**Stewart Warner Corp.,** Chicago. $1,002,000. Production of communications equipment for F–4C and F–101 aircraft. Chicago. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

17—**Wall Colmonoy Corp.,** San Antonio, Tex. $1,845,607. Repair of jet engine combuston chambers. San Antonio. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**American Electric, Inc.,** Paramount, Calif. $2,117,422. Production of aircraft ordnance. Long Beach, Calif. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**General Electric,** Philadelphia. $11,200,000. Research and development of the MARK 12 re-entry program. Philadelphia. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

19—**General Electric,** Philadelphia. $2,500,000. Work on the MARK 12 re-entry vehicle program. Philadelphia. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**RCA,** Princeton, N.J. $1,000,000. Production of components for a satellite program. Princeton. Space Systems Div. (AFSC), Los Angeles.

—**Martin-Marietta,** Orlando, Fla., $1,314,092. Production of communication equipment for modification of F–105 aircraft. Orlando. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**General Dynamics,** San Diego, Calif. $1,850,000. Design and fabrication of components for a space program. San Diego. Space Systems Div. (AFSC), Los Angeles.

20—**Philco Corp.,** Palo Alto, Calif. $2,000,000 and $1,000,000. Work on satellite control network. Palo Alto. Air Force Satellite Control Facility (AFSC), Los Angeles.

—**Texas Instruments, Inc.,** Dallas, Tex. $3,136,534. Radar equipment for F–4C aircraft. Dallas. Warner-Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**Battelle Memorial Institute,** Columbus, Ohio. $1,000.000. Operation of the Defense Metals Information Center. Systems Engineering Group (AFSC), Wright-Patterson AFB, Ohio.

—**General Electric,** Cincinnati, Ohio. $4,367,925. Support of the B–70 flight test program. Cincinnati. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Bell Aerospace Corp.,** Buffalo, N.Y. $2,000,000. Rocket engines. Buffalo. Space Systems Div. (AFSC), Los Angeles.

—**Oregon Technical Products,** Grants Pass, Ore. $1,408,436. Production of bomb racks. Grants Pass. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

21—**Westinghouse Electric,** Baltimore, Md. $2,417,283. Production of major components and spare parts for radar systems. Baltimore. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

24—**General Electric,** Cincinnati, Ohio. $1,522,197. Production of modification kits and spare parts for J–79 aircraft engines. Cincinnati. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

25—**Henry Spen & Co.,** Brooklyn, N.Y. $2,214,500. Production of munitions handling trailers. Brooklyn. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

27—**General Electric,** West Lynn, Mass. $58,846,395. Production of aircraft engines (T–64–GE–6, T–64–GE–10 and T–58–GE–10). West Lynn. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

28—**General Electric,** Philadelphia. $1,500,000. Re-entry vehicle flight test program. Philadelphia. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**General Motors,** Indianapolis, Ind. $14,124,000. T–56 aircraft engines and related equipment. Indianapolis. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Otis Elevator Co.,** Stamford, Conn. $4,502,772. Modification of electronic warfare simulators. Stamford. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

Six New Members Join Defense Industry Advisory Council

Deputy Secretary of Defense Cyrus R. Vance, Chairman of the Defense Industry Advisory Council (DIAC) has announced the appointment of six new members to the council to replace retiring members and fill two vacancies.

The new appointees are:

Fred J. Borch, President, General Electric Co., New York, N. Y.

Kermit Gordon, Vice President, Brookings Institution, Washington, D. C.

Daniel J. Haughton, President, Lockheed Aircraft Corp., Burbank, Calif.

Donald A. Holden, President, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

Roger Lewis, President, General Dynamics Corp., New York, N. Y.

Noel B. McLean, Chairman of the Board, EDO Corp., College Point, N. Y.

The council was established in May 1962, and has provided a forum for discussions by the Secretary of Defense and his principal assistants with leaders selected from private economy.

The six new members were appointed under a rotation policy designed to provide a wide range of participation and representation while still keeping the council small enough to be workable.

Members of the council who are retiring are:

Elton D. Carter, Consultant, Glen Burnie, Md.

Charles E. Hastings, President, Hastings-Raydist, Inc., Hampton, Va.

J. Ed Warren, President, Cities Service Co., New York, N. Y.

Major General James McCormack, USAF (Ret.), Chairman of the Board and Chief Executive Officer, COMSAT Corp., Washington, D. C.

Consistency in Security Guidance Sought

One of the objectives of the Classification Management Program of the Department of Defense is to avoid and eliminate overlapping and inconsistent classification guidance issued to defense contractors by two or more user agencies.

Classification guidance issued by any single user agency to all of its own contractors may be consistent within that agency but at the same time may be in conflict with guidance to those same contractors issued by one or more other user agencies.

Therefore, it is essential that contractors faced with classification problems resulting from conflicting instructions promptly bring them to the attention of the user agencies concerned.

Concurrent notice to the Directorate for Contract Administration of the Defense Supply Agency, and to the Directorate for Classification Management, Office of the Assistant Secretary of Defense (Administration), is suggested as a helpful method of handling such problems.